

the result of another year's tireless effort to produce a high powered, six cylinder motor car of the highest efficiency, greatest dependability and the most correct design. Following their rigid policy of improving motor car construction wherever possible, but of adopting no change that has not been under close observation for many months, the McFARLAN engineers have felt that they could best serve the public by directing all their thought, care, skill and energy to one chassis.

Thenewtypecars are unusually low in appearance, immediately responsive to the call for speed or power. They are silent, restful and dependable. The McFarlan body designs which have been much sought for many years are more distinctive than ever before. For the coming season we offer the most correct designs for every requirement, both in open and closed models.

These luxurious cars are not expensive when the exclusive design and fine materials are considered.

The price for all open touring types is \$3500. Subject to change without notice. (Book 38 is now available to those interested in luxurious cars).

McFARLAN MOTOR COMPANY

CONNERSVILLE



INDEX TO ADVERTISERS



EAGLEINE OILS

are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

These are the claims of thousands of motorists,—some with years of experience, who want full value, and more who know the value of high grade lubricants, and who know when they obtain satisfaction.

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A grade for every type of motor. It is sold in sealed containers.

Let us send you our new book and chart. It is free at request.

EAGLE OIL AND SUPPLY CO.

44-45-46 India Street, Boston, Mass.

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Ford Size Tires New 30x3½ Non-Skid \$7.50

Jandorf Automobile Company 1763 Broadway, New York

MACHINERY.

One new Pettingill Rotary Shears; capacity No. 14 gauge, 60" throat. McCabe Boiler Wks., Newark, N. J.







DEALERS

If you want to control the battery business in your territory

WRITE OR WIRE FOR THIS BOOK

on Permalife and the National Storage Battery Exchange System

It explains how the National System of Storage Battery Exchanges gives constant, permanent service to the motorist.

It shows how its marked economy ends storage battery troubles for all time—for dealers and motorists alike.

It shows in innumerable ways the intensive co-operation we give dealers to make their business highly productive.

Over 500 high-grade dealers in all parts of the country are now taking advantage of the motorists' demand for Permaiife. If you want your business to be the biggest storage battery business in your territory, apply for Permailfe representation. The name alone will be an immeasurable asset. The book explains.

Permalife territory is being assigned rapidly. You can't delay a minute if you want to profit by our method of guaranteeing perpetual storage battery service—if you want to dominate the storage battery field. Address Department A J-8 for our book "What Permalife Is."





AUGUST 10, 1917.

NO. 1.

LXIV.

NEW memberships in motordom are gained by campaigning for them, much on the same lines that a club or association would follow if they set out to increase their lists. This is one important reason why new recruits to the cult of the motor car are to be sought by the arousal of their interest in used cars. Motordom needs new recruits constantly, no less than the army of national defense needs recruits. In the stand taken by this magazine on behalf of the motor car owner, dealer and manufacturer, special attention is given in this issue to the possibilities of greatly enlarging the ranks of motordom by "Giving the Used Car a Chance." The utilities of motoring, likewise the delights of motoring belong to no one set of individuals. Motordom is an exceedingly democratic land and there is not only room for many more inhabitants, but a welcome for them and enjoyments for all.

MORE insight into the mechanical assembly of motor vehicles is afforded the new motorist, or the experienced motorist, in a very informative article on the "Restoration of the Chevrolet Car." Motorists who are wisely bent on knowing their car thoroughly, and those who realize the exceptional benefits secured by "working on the car" themselves will find text and illustrations of the operations exceedingly valuable.

THE National Automobile Association presents many advantages to its large and growing membership. Its services to motorists are well known and that they are widely appreciated is attested by the fact that it is today one of the leading and most influential motoring organizations in the country. The association journal in this issue, besides its usual information pages, contains also a review of four years' work of National Highways Association.

Page Giving the Used Car a Chance. Motordom's Interest in Its Hill Climb to a Fair Market Quotations on Used Cars. Restoration of Chevrolet... Third Article on the Examination of Second Sale Cars Graphic items of the Day.....17 Garages-Plate VI......18 Design for Fourteen-Stall Modern Community Garage, Midsummer Motor Modes... By Mrs. A. Sherman Hitchcock. National Automobile Association 23 Official Journal Carrying Information of Traps, Tours. National Highway Association, .25 Review of the Work of the Society in Past Four Years. Two Popular New England Tours 27 Accessories and Equipment,31 New McFarlan Model.... The Cadillac Eight......37 General News of the Industry...38 N. A. C. C. Campaign......40 Answers to Queries......41 Advertisers' Index..... -:::-Treasurer . . WILLIAM H. BLACK Secretary . . . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

COMMON sense counsel is contained in a circular letter issued by the National Automobile Chamber of Commerce to members urging concerted action in the industry to offset the injurious influence of many alarmist stories appearing from time to time in the daily press. Cooperating with the manufacturers, the periodical press and the National Automobile Chamber of Commerce, there is every reason to allay panicky feeling and substitute certainty for uncertainty in the success and continuance of business during the war. This is midsummer: the silly season, to a certain extent, and the ground work for winning the war must be established by legislation in Washington, by decisive programmes on war revenue taxation, control of food and of railway transportation, steel supplies and exports, and it is about these highly important measures that the silliest canards are the surest to be woven. The chamber's admonition to save, not waste gasoline, is entirely proper, reasonable and right. It would be wisdom, war or no war. To arouse the people to a full realization of the task of war ahead, it is hopeful that it will not require disaster to accomplish the end sought. "Honking" may be easily overdone.

THE topic in the idea exchange this time, another one dealing with tires, brings up the question of how much they are damaged by running in the car tracks. In this connection a line to the editor from the writer of the winning letter on the previous tires question points the way to one who might ask, "How is it done?" He says: "I value your journal above all others, and I have had several; and upon seeing this subject, about which I felt I had had considerable experience, I wrote accordingly." The tire and track question appears exceedingly promising.







QUOTATIONS OF UNCONTROLLED USED CAR MARKET

In the Sales Columns for Automobiles Far and Wide the Owner Voices Continuous Protest Against Many Deflated Values

In the attached list of advertisements taken from different New York and New England newspapers, one finds a fairly accurate table of second hand car values as established in the open mar-Where possible the advertisements have been selected to show the range of offering prices on the same model, giving the highest and lowest price, and in other instances just a single advertisement on one make and model is used. Different styles in one yearly model are also submitted where the advertisements are available.

While as previously stated in this journal, prices are largely contingent upon condition of a car, as a means of ready reference to determine market values ap-

proximately, this compilation of advertisements gives as near the actual market value as anything printed and establishes a maximum price which is actual. Just how much less a car could be secured for, below the prices quoted, of course would depend upon conditions governing each individual case. Where private parties are making the offerings it is often possible to secure a material reduction from the offered price, as in most cases these individuals had rather make some sacrifice to get the car off their hands. With used car dealers. however, the price advertised is usually about the bottom, although it may be said that in fixing their prices these dealers seldom resort to the trick of placing

an artificially high price on their stock so as to enable them to lower it when a prospect is inclined to seek discounts. In fact, the used car dealer, as will be found by examining the various advertisements, tries to set his price as near the actual market as possible, keeping in mind, however, his overhead, repair expense and a fair profit.

In many cases the wide variance in prices on the same make and model are largely due to the difference in the condition of the tires, as four good tires are worth on the average over \$100, while an outlay of that much will soon be necessary on a car equipped with shoes and tubes that have overrun their smar-

AUTOMOBILES

1917 BUICK TOURING, \$775. Little Six model, has wire wheels and is in finest necessarical condition; all good shoes and original paint is excellent; powerful, quiet running and easy riding.

> 9750-1917 BUICK SMALL SIX. Touring; in perfect condition.

1916 BUICK, \$700, car, run 3800 miles, little six model, just been thoroughly overhauled and looks and runs like a new car, equipped with all new tires, spare rim and tire, light and inexpensive to operate.

1916 BUICK TOURING; model D-55, 7passenger; in fine condition; \$1000,

1016 BUICK SMALL SIX TOURING. excellent condition; has had the best of care; tires and paint good.

\$385 -1915 BUICK ROADSTER. Model 25; in perfect condition and fully equipped; this is a light car and very economical to run.

1915 BUICK ROADSTER, \$475. Model C 36; in extra fine condition; newly painted and recently overhauled; all fine shoes and extra; call at once for thorough demonstration of this popular runabout

1917 CADILLAC TOURING, \$1700. Run less than 2500 miles by present owner, who must dispose of it at once; owner can be referred to as to condition throughguaranteed fully and thoroughly demonstrated.

CADILLAC 1916; 7-passenger touring er; perfect condition; only used four months: \$1600.

8750-1915 CADILIAC.
7-passenger touring; in good mechanical condition and one spare tire.

1916 CADILLAC, 7-PAS, TOURING, \$1250. An exceptionally attractive car that has been exceedingly well kept; paint, var-nish, upholstery and tires are almost like new car has had very little mileage and is submididly equipped and the price at which it is offered is exceptionally low for so good a car: "money back guarantee"

\$700-1916 CHALMERS.

-passenger touring; in very good condition, with complete equipment,

AUTOMOBILES

1016 CHALMERS TOURING, \$ Almost brand new and must positively be seen to be appreciated; original paint is perfect and all shoes are like new; an exceptional trade for some one; don't miss it.

1916 CHALMERS 6-40, \$525. 7-passenger touring; has been revarnished and is in good running condition.

-1915 CHALMERS. Coupelet; a fine 3-passenger car with complete equipment.

1917 CHANDLER TOURING CAR \$050. Driven very carefully but 6000 miles by a lady; all new tires and in fine condition; traded for a Willys-Knight.

1917 CHANDLER, 7-PASSENGER, \$778.

CHEVROLET, 1917 touring; model Baby Grand; car has been driven only 2500 miles; price \$600.

1916 CHEVROLET TOURING, \$460. 5-passenger; electric lights and starter, demountable rim and many extras; choice of two, one at \$375.

1916 5-passenger CHEVROLET; many extras: \$385

1915 CHEVROLET, \$325. Roadster, with electric lights and extra shoe; always been driven by original owner, who has just traded for touring enr: has been newly varnished and looks like

1915 CHEVROLET "Light Six" touring

DODGE 1917 TOURING CAR, \$678. Used 2600 miles; has every possible equipment and is like new; one extra shoe mounted; has the high hood and the long wheelbase, open to mechanical inspection and demonstration day, evening or Sun-

DODGE BROTHERS TOURING CARS. 1916 production; choice of a limited number from \$500 to \$615.

DODGE BROTHERS TOURING, \$450. 1915 production; present owner will sell this week only.

DODGE RROTHERS ROADSTER, \$550. 1916 production; has low mileage; been well taken care of.

AUTOMOBILES

-DODGE 1916 TOURING CAR. Good condition; owner will demonstrate.

\$875-1917 FORD TOURING CAR. Been used very little and is in the finest possible condition and is fully equipped; has over sized tires and guaranteed.

-1917 Ford touring car; perfect order; sell for \$325 or best uffer; can be seen at Liberty Garage after Sunday.

1017 FORD TOWN CAR, \$465. Used privately about 900 miles; fully equipped; many extras, shock absorbers, same size tires all round, nobby tread; Used

\$450-1917 FORD TOWN CAR. With demountable rims; extra tire and rim and many extras.

1917 FORD COUPELET, \$468. Used 1100 miles and just like new; fully equipped; many extras; call for demonstration.

1917 FORD COUPELET, \$425.

\$285-1016 FORD TOURING CAR. In excellent condition; has Firestone de-mountable rims; extra tire and rim and and many extras, paint and tires perfect,

1916 FORD, \$265.

Touring our: fully equipped; many extran, shock absorbers, Crown fenders, demountable rims, same size tires all round, bumper on front of car, has had very little mileage and is in fine condition.

1916 FORD TOWN CAR, \$365.

Has been used three months privately and is in the finest possible condition; same size tires all round: 4 new tires; cost new with extras \$795 bargain,

1916 FORD COUPELET, \$395.

1915 FORD TOURING, \$250. To \$300, seven to choose from; some with electric lights, extra shoes, slip covers; some with new 1916 hodies.

1915 FORD, \$225. Roadster; fully coulposd; many extras; oversize tires, special 1917 hood, has been used excefully; fine condition like new;

> \$275-1915 FORD TOWN CAR. In perfect condition.

\$365-1917 FORD TOWN CAR. With demountable rims, extra rim, side curtains for driver's seat.

1916 FRANKLIN TOURING, \$1850. Finest possible condition; only run few thousand miles and positively cannot be told from new; all tires practically new and paint perfect; guaranteed fully.

1916 FRANKLIN TOURING, \$1175.

1917 HUDSON SUPER-SIX SEDAN. Here is a car that we feel safe in saying cannot be distinguished from one that with black hood and trimmings; there is ample room for seven passengers to be seated comfortably and the excellent riding qualities are worthy of special com-ment; the gray whipcord upholatory ap-pears neither soiled nor worn and the whole car presents a very smart effect. tires are in very good condition—all non-skids—size 35x4½; may we arrange a demonstration to suit your convenience? This car may become your property at

HUDSON 1916 touring; in excellent shape; newly painted; tires new; \$750; can be seen at garage.

1916 HUDSON, 9700.

Yacht line body; newly painted; oversize tires; a light, economical 5 or 7-passenger car: small mileage

\$550-1915 HUDSON 6-40.

Seven-passenger touring car; in A1 condition and is fully equipped.

\$800-1917 RUPMOBILE TOURING. In excellent condition.

1917 HUPMOBILE TOURING, \$050. Very latest model; only run few hundred miles and is guaranteed like a new car; don't miss this excellent trade in a fine, light family touring car.

1916 HUPMOBILE LIMOUSINE. Owned by private family who have a number of cars and have no further use for this one: almost new, as it has been used very little; call for exceptional bargain.

1816 JACKSON EIGHT, \$780. This is an especially comfortable, roomy 7-passenger touring car, with special up-holstery: all good tires; lots of extras; "money back guarantee."

1917 MAXWELL ROADSTER, \$478. Who has no further use for a car; a fine, light runabout, inexpensive to operate and easy riding; full guarantee and thorough demonstration.

MAXWELL 1917 runabout; new condi-on; price \$425; subject to ressonable offer.

1916 MAXWELL TOURING, \$400. 4-cyl.; finish like new: low mileage; excellent mechanical condition; electric lights and starter.

1916 WAXWELL TOURING, \$250. This fine light car has been used very lit-tle and is in excellent condition through-out; all good shoes and original paint is in good condition; guaranteed.

1916 MAXWELL, \$375,

Roadster, with self-starter, electric lights. In the finest possible condition; tires and paint new: demountable rims, one extra. shock absorbers; call for demonstration

MAXWELL roadster, 1916; new tires newly painted and overhauled; guarantee ms to condition: \$450.

FOR SALE-1915 Maxwell touring: perfect condition: starter and lights: \$350,

1016 WETE TOURING, \$350. Electric lights and starter; had very low mileage; used entirely by private family; very economical to run.

1917 METZ touring car; used only 80 days; run less than 800 miles; reason for selling, financial difficulties; I will sacriaelling, financial difficulties; I will a fice this car for \$550; looks like new,

1917 METE, \$885.

Touring car with self-starter, electric lights, original tires and paint and cannot be told from new; fully equipped with ex-trus, one spare tire and rim; fully guaranteed; call for demonstration.

1916' METZ ROADSTER \$215. Lights and self-starter, dandy car; all in nice condition

METZ runabout; overhauled factory, late 1916, self-starter, electric lights, demountable rims, two spare, \$350; must sell; owner going abroad.

1915 METZ speedster, perfect condition, erhauled, 4 new shoes, will sacrifice for \$130.

\$1250-LATE 1915 OR EARLY 1916 Mercer roadster in the finest possible con-dition; tires and paint like new.

1916 MITCHELL, \$700.

A well built, beautiful 5-passenger touring car that has been carefully taken care of and always driven by one person; "money back guarantee."

1916 MITCHELL 6, 7-PASSEYGER, \$600. With four almost new tires

1916 NATIONAL TOURING, \$750. Newport model; cost \$2500 and is in finest possible condition throughout; powerful, perfect riding and quiet running; call for thorough demonstration.

FOR SALE-Overland, 5-passenger, 4cyl. car. 1917 model: electric lights and starter; terms; price \$600; 2 new non-akid tires on back: 1 new Goodyear front.

\$400-1917 OVERLAND TOURING. been used very little and is ab solutely like new and is fully equipped.

1916 OVERLAND, \$385.

Model 83, 5-massenger, very economical newly painted, small tires and looks and runs like new; self-starter, electric lights: all in fine mechanical condition; just the car for small family; call early; must be sold this week.

MODEL 83 1916 OVERLAND, \$375. Touring car: used 2900 miles; was delivered Sept. 20; equipped with self-starter, electric lights; has been used privately and is in extra fine condition; like new.

1916 OVERLAND RUNABOUT, \$450. Electric lights and starter; extra tire

OVERLAND runabout: 1916: \$225: extra new shoe and tubes; electric starting and lighting: elegantly equipped; 30 days. trial allowed.

1915 OVERLAND, \$425.

Model 80 roadsters, 2 to choose from; one equipped with 4 brand new Kelly Springfield tires; overhauled and revarnished; this was the best model made by the Overland Co.: cost new \$1125; three months' guarantee.

\$885-1916 MODEL 80 OVERLAND. Touring car: in good condition and is fully equipped.

1917 OAKLAND TOURING, \$675. Light six; almost new and will be thoroughly demonstrated to intending purchaser; inexpensive to operate and very powerful; guaranteed fully. operate and

1917 OLDSMOBILE touring; used a lit-tle for demonstrating; \$1200 for quick sale; list price \$1542; 1916 8-cvl. Olds. looks and runs as good as new; \$775; Ford touring, late model, \$220.

1916 OLDSMOBILE "S," \$700. 5-passenger, light and inexpensive very casy riding; paint new; tires operate: practically new. practically new, natural wood wheels, very good looking car; guaranteed thoroughly; ride in this car and you'll thoroughly; ride in this car and you'll satisfy yourself as to its power and com-

1916 OLDSMOBILE "4," \$580.

b-passenger, will do 18 to 20 miles on a gallon of gas; car looks as good as new, fully guaranteed; just the car for small family; very easy riding and condition is perfect; call early for ride.

1916 OLDSMOBILE "4" ROADSTERS. Several to select from; equipped with extra folding sest in rear and up-to-date in every respect; these cars were listed at \$800; price now is \$550 and \$650.

AN OLDSMOBILE CABRIOLET. 1916 four; model 43 serial; three-passen-ger; ideal for lady or physician; \$750.

1917 PAIGE TOURING, \$1025. Stratford model; cost \$1700 and in abaolutely perfect mechanically; original paint not scratched and 4 nearly new Firestone tires; easy riding and very powerful; call and ride.

1916 PAIGE "4-46."

5 or 7-passenger touring; overhauled, re-painted new tires, Continental motor, Gray & Davis starting and lighting sys-Continental motor, tem: \$900.

1916 PAIGE FAIRFIELD SIX, A classy car; plenty of room; 7-passenger; make a good jitney; our price new \$690

\$1500-1016 PEERLESS.

8-cy, touring; just out of paint shop; full equipment, including new extra shoe and tube; sold with our used cur guarantee,

1015 PULLMAN 7-PASSENGER \$400. Motor in fine condition; just out of paint shop; wire wheels.

1916 SAXON ROADSTER, \$550. In beautiful condition; tires and paint like new; just the car for a man that wants

1916 SAXON TOURING CAR, \$550. Tires, paint and motor in excellent con-

1915 NAXON HOADSTER, \$250. Hand horn, speedometer, Atwater Kent system; tires like new.

STEARNS-KNIGHT 1916 LITTLE 4. price \$700; reasonable offer considered.

SERIES 17 STUDEBAKER, 6-CYL, \$775. Combination 5 and 7-passenger touring car: light weight, economical, high pow-ered and flexible; renewed, repainted and guaranteed

1917 STIDEBAKER, 6-CYL., \$725, assenger touring; there are two of 7-passenger touring; the

1917 STUDEBAKER, MODEL 35, \$650. 7-passenger: original paint: 4 good tires,

SERIES 17 STUDEBAKER, 4-CYL., \$625. Combination 5 and 7-passenger touring car or 3-passenger roadster; renewed, repainted and guaranteed.

1916 STUDEBAKER, \$475. 4-cyl., 5-passenger touring car; self-start-er, electric lights; has been used 3 months and was traded in for closed car; fully equipped.

1915 STUDEBAKER, 4-CYL., \$475. 3-passenger roadster; very economical; 18 to 20 miles on a gallon of gasoline; rebuilt, repainted and guaranteed,

1915 STUDEBAKER ROADSTER, \$350. A 3-passenger runabout; recently re-painted; good tires.

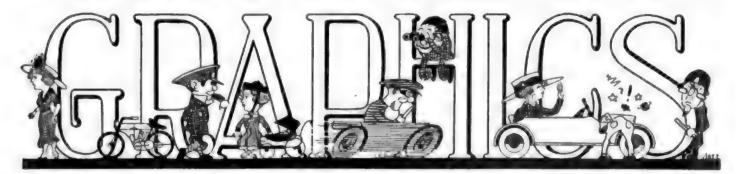












"Stick to your last" and "too many irons in the fire" are old axiomatic sayings, which, if they had been heeded by a New York accessory dealer, would have saved him from a state of bankruptcy. He was making money fast out of motorists and ahould have obeyed the principle of the first saying and stuck to his business, but he decided to back a more ancient form of transit and went too often to the race tracks, where to his sorrow the "ponies" ran opposite to the way he placed his bets. His extra irons in



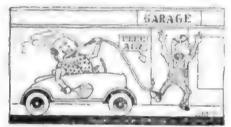
the fire cost him \$25,000, according to information imparted to the judge.

—:::-

With the mobilization of the troops and the gradual increase in the tonnage from this country abroad, it is thought an excessive demand will be made on the oil companies. Unless production of gasoline is increased very greatly it is thought very probable that the cost of "flivving" will be more expensive within a short time.



The public has long been wont to overdo a "good thing" such as free accommodations of any kind, but the most flagrant case of this ingratitude toward the dispensers of these favors was dis-



covered by a western garageman, when, upon emerging from his shop, he found a corpulent gentleman seated in his car with the "free air" supply tube directed against his sweating countenance, the stream of air blowing away the beads of perspiration.

Feeling piqued when he found a summons in his car to appear before the police commission to answer a charge of violating some mysterious clause in the



traffic laws, a salesman in Providence cranked up his puddle jumper and sped to police headquarters, with a sentence of seven years under water staring him in the face. The mystery deepened because of the fact that he enjoyed close personal acquaintanceship with all the commissioners, and they declared the summons to be spurious. After nodding wisely to one another he set out on an earnest search to find the perpetrator of the sinister document with an invitation. Said culprit was not declared in on the libation, but took his refreshment alone while musing over the consequences of illtimed jokes.



Women have long held the talking championship for distance without changing their minds or breath, but to a Los Angeles woman goes the honors for a long distance auto trip without changing gears, which is said to be an exceptional feat for the average driver. Mrs. C. F. Crank, the holder of this unique title, drove her car from Los Angeles to San Francisco, a distance of 430 miles, without once throwing out of high.

Three pretty maids all in motor togs and wearing their most seductive smiles, faced Magistrate House in the traffic



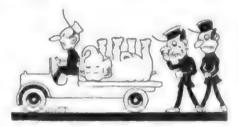
court in New York City the other morning, but this silent plea for leniency and forgiveness failed to penetrate his honor's dignity and soften his judicial temperament. For passing the traffic cops on Riverside drive and other points at a speed which made the minions of the law jealous, they were asked to forfeit from \$25 to \$40 to remind them that it was not permissible to overspeed on the highways.

—:::—

The average school boy has about as much affection for his reading, 'riting



and 'rithmetic as the general public has for the chief of the Hohenzollerns, but there is a boy in a Bay State village who has a fond attachment for his school books owing to the fact that they probably saved his life, as did the Bible that the soldier was carrying over his heart when a bullet came and spent its force among the leaves. The boy was coming along the street carrying his school books under his arm when struck by a motor car. The blow knocked him down, but most of the force was spent in scattering the books and prevented a serious injury.



"Dunk," the famous pachydorn, who entertained the peanut munchers on the circus bleachers for many years and later retired to the Zoological Park in Washington as exhibit A is no more. His death was not naturally, but owing to an unfortunate mishap he had to be Oslerized with the soporific influence of eight bullets from a 45 caliber rifle. The performance of the last rites for Dunk were commensurate with his size, his weight of six odd tons requiring the requisition of a 3½-ton Packard truck to carry him to his last resting place.

PLATE SIX

COMMUNITY GARAGE OF FOURTEEN STALLS

Laid Out for a Lot 100 Feet Square, Containing a Court Yard, Repair Shop, Heating Plant and Stores

Designed by the Architectural Department of the Automobile Journal Publishing Co.

ARAGES as real estate investments are at present one of the most active features in the realty field. There are many lots in some neighborhoods where the modern type of community garage can be erected with the certainty of its proving a paying proposition. The automobile owner is always ready to pay for accommodations and any garage offering him extra conveniences and facilities can usually gain the patronage even at a higher figure than is charged by garages where only necessary quarters are furnished.

Such a garage of the community type as shown in the accompanying plate is designed for the average city neighborhood and to front on a street where there is considerable traffic in order to rent the two stores advantageously.

The garage is laid out for a lot 100 feet square and contains a large court yard in the centre 56x63 feet, affording ample room for manouvering the cars about before running them in the stalls or repair shop. Two stores flank the main entrance and the rear corners are occupied by a boiler room and repair shop, the latter being equipped with drain, two pits, sink, work bench and closets. If the location is proper the owner may conduct one of the stores as an automobile supply station or agency and operate the repair shop as a side line.

In all there are 14 stalls, or compartments, each a private garage in itself, complete in every detail. The stalls are ample in size to house the largest of touring cars, being 10 feet wide and 20 feet deep. Each compartment is equipped with a steam heater and electric lights and running water with bowl is provided. All these conveniences are provided and maintained by the owner and are covered in the monthly rental.

The boiler room is designed for a plant to heat the entire structure. It leads from a small vestibule, which also opens into small janitor's room containing a set bowl and toilet. If the owner desires to have a large cellar for storage provision is made for three stairways leading off the stores and boiler room.

The main structure is of brick, tile and terra cotta construction. The party walls and curtain walls are of common brick, as they are not exposed to view on the outside. Tile and terra cotta are used in the front elevation, backed up with brick. Brick may be substituted for the terra cotta and the same effect obtained.

Foundations should be made of good concrete,

sufficiently large to support the superstructure, for which this department will furnish specifications and formulas upon application.

A roof of tar and gravel is considered the most satisfactory for this type of building, a good combination being five-ply tar and gravel. Lead flashing should be used or toncan metal, if builder desires to go to the extra expense.

A large skylight with ventilator in the top furnishes efficient light and ventilation. The lighting effect is also aided through the large glass panels in the front doors which occupy most of the door area.

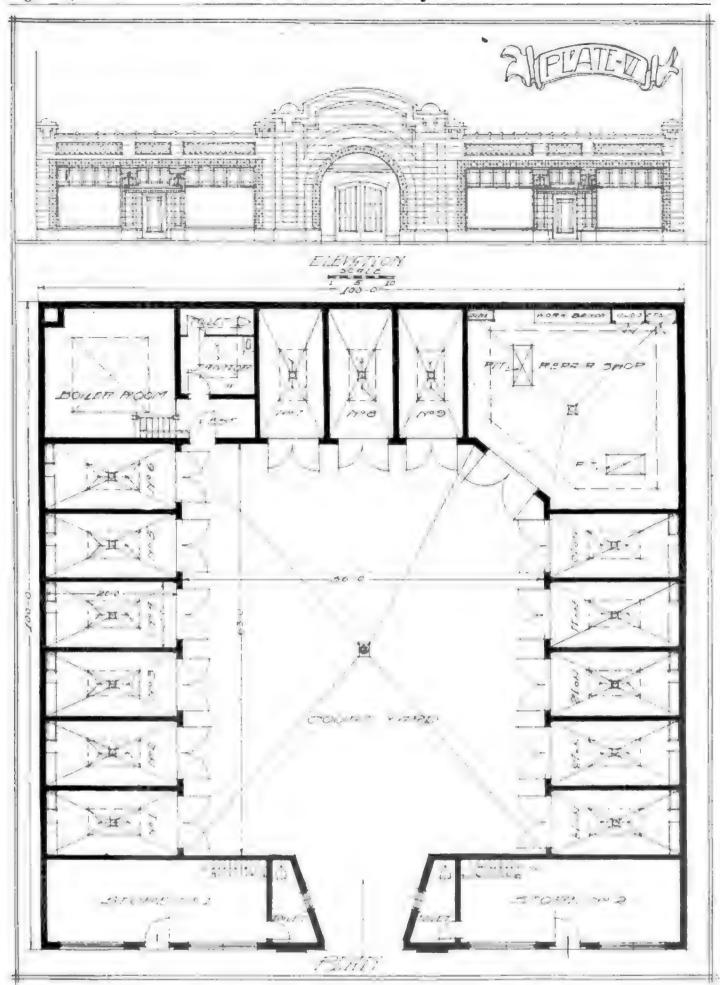
A considerable variation in the cost of a garage of this type will be found owing to the difference in ground rents, labor and cost of materials in various sections of the country. The garage could be erected under average conditions for from \$10,000 to \$15,000.

The income from such an investment, however, would depend largely on location and management. At prevailing garage rates where similar service and facilities are afforded the rentals on the stall alone should aggregate between \$1500 to \$2000 annually, while the store rents would vary from \$40 to \$100 a month each, the figure being entirely dependent upon location. Assuming that the two stores brought in \$100 a month rental, a total of about \$3200 a year would be realized. There would be considerable extra profit, however, from the investment, should the owner engage in the supply business and other branches of the automobile business, for which an exceptional opportunity would be created in the existence of the garage.

In all the large cities motorists are inclining toward the community type of garage with individual stalls, as it not only saves them time and trouble, but once the car is in its stall they know it is safe from prying hands and when they want to get it out there is every facility at hand for preparing for a trip. These conveniences are recognized generally and motorists are willing to pay the increased rental which is necessary to obtain them.

As the modern apartment house was the forerunner of adequate housing for people in the large cities, so the community garage presents itself as a solution of the problem of housing their automobiles. One walks into his apartment, locks the door and calls the place his home, while his automobile has been put away until he wants it again in a locked room around the

corner.



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and a fair and equal opportunity to pass to the other; if he overtakes another the person overtaking shall pass to the left side of the person overtaken and the person overtaken shall, as soon as practicable, turn to the right so as to give half of the traveled road as a free passage on the left to the other.

Right of Way.

The person overtaken and passing to the left of the person or vehicle overtaken shall do so subject to the right of way of those traveling in an opposite direction and meeting him at the point where he is to pass the persons or vehicle overtaken. Any person shall at the intersection of public highways keep to the right of the intersection of the centres of such highways when turning to the right and pass to the right intersection when turning to the left. Every driver or operator of a vehicle approaching the intersection of a street or public highway shall grant the right of way of such intersection to any vehicle approaching from his right, providing that traffic officers at such intersection may direct traffic.

Civil Actions.

Another important provision of the law is concerning civil actions. In civil actions if motorists injure persons or property in violating the rules of the road, the court may grant double or treble damages with the costs if the complaint is maintained. This means a \$3000 loss instead of a \$1000 loss if you are found violating the rules, or if a man is hurt to the extent of \$10,000 worth the court may grant him \$30,000.

Failure of an Officer to Report Violations.

If any officer fails to report violations of the law to the proper prosecuting officer and a motorist knows of it, he may sue him within 90 days and get a \$10 judgment.

Mirrors or Reflectors.

Every vehicle so constructed that the driver or operator is prevented from having a constantly free and unobstructed view of highway to rear and at the sides of the same, shall be equipped with a mirror or reflector attached to and so located and adjusted on such vehicle as to give the operator thereof a clear reflected view on the highway to the rear of such vehicle. That means business to all, automobiles as well as I umber wagons. The penalty for the violation of this section is a fine of not less than \$5 nor more than \$25 for each offense.

NEW HAVEN RULES.

NEW HAVEN, CONN. The Board of Aldermen of this city have just adopted the following ordinances relative to one-way traffic and parking places: "No vehicle shall be allowed to remain standing for more than 15 minutes on Church street between Chapel and Court streets, and no vehicle shall be allowed to remain standing for more than 15 minutes on Church street between George and Chapel streets, nor on Church street between Court and Elm street; on the east side of Church street, between Court and Elm streets; or on Chapel street, be-

tween York and State streets. No vehicle shall be allowed to remain standing for more than one-half hour between 8 o'clock in the forenoon and 7 o'clock in the afternoon on Crown street, between State and College streets; on Center street, between Orange and Temple streets; on Court street, between State and Church streets; on Temple street, between Chapel street and Congress avenue; on Gregson street, between Chapel and Crown streets; or on Orange street, between Elm and Crown streets; provided that this section shall not apply to any vehicle while the same is being loaded or unloaded with goods or merchandise, but in such case such loading or unloading shall be done with dispatch and not in an unreasonable man-

Section 828-The following places are hereby designated as parking places for vehicles in the city of New Haven, viz.: Elm street, on the southerly side, between Church street and College street; Church street on the west side for a distance of about 300 feet north of Elm street; Church street on the westerly side, between Court and Elm streets; and College street on the east side, between Chapel and Elm streets. Any vehicle may be parked or allowed to remain standing at said places between 8 o'clock in the forenoon and 8 o'clock in the afternoon, except for a period of not over two hours, and every such vehicle shall be placed at an angle about 45 degrees with the side of the street, except on College street, and where cars shall be parked parallel with the curb and as close thereto as practical, and shall be headed with the direction of traffic on the side of the street on which it is placed. Except as herein provided no vehicle shall be parked at any of said places in said city.

Section 832. The following named parts of streets in the city of New Haven are hereby designated and declared to be one-way streets and no per-

son shall lead, ride or drive any animal, nor shall drive or propel any vehicle on, along or over said parts of streets in any direction except as hereinafter provided, viz.: Court street, between State street and Church street, on which all traffic shall go westerly; Center street, between Temple street and Orange street, on which all traffic shall go easterly; Gregson street, between Crown street and Chapel street, on which all traffic shall go northerly; any vehicle may stop on either side of any part of said one-way streets except as provided in section 326 of these ordinances, but such vehicle shall stop headed with the direction of traffic and close to the curb, provided that section 820 of these ordinances shall not apply to any vehicle stopping in any one-way street under the provisions of this section.

Section 83214. No cars shall park on Temple street between Chapel street and Congress avenue, or on Center street, between Temple and Orange streets, except on one side of the street. Cars shall be parked on alternate sides of the street on alternate months, as follows: On the east side of Temple street, beginning Sept. 1, 1917, and continuing thereon until Sept. 30, 1917, when said cars shall be parked on the west side of Center street beginning Sept. 1, 1917, and continuing thereon until Sept. 30, 1917, when said cars shall be parked on the south side of the street from Oct. 1, 1917, until Oct. 31, 1917. Thereafter cars shall be parked alternate months and on alternate sides in the same manner as above, provided this shall not apply toany vehicle, while the same is being loaded or unloaded on either side of the street.

The police are ordered to place the proper markers in their proper places according to the inclosed ordinances.

The board also passed the ordinance prohibiting vehicles from standing on Temple street, between Chapel and Elmstreets.

WHITE LIGHTS IN NEW JERSEY

New Law Makes Yellow Lenses Illegal

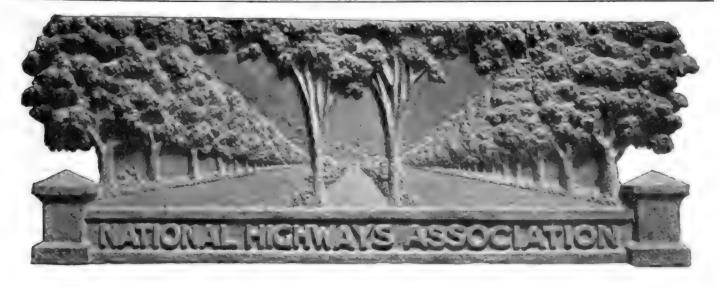
New Jersey has a new law calling for white lights, and the use of yellow lenses in that state has been declared illegal. It is stated, however, to be permissable for a non-resident of New Jersey who is in the state for a few days only, to use the yellow lenses. If, however, the motorist is to remain in the state longer than a few days clear lenses must be substituted for the yellow ones.

The motor vehicle commissioner of the State of New Jersey states: "We are perfectly willing to permit foreign registered cars to travel through New Jersey without the necessity of the removal of the amber colored lens. If, however, the foreign registered car is to remain in the state for a period of time, then we must insist that an approved lens be used. Our law specifically states that the light shall be a white light and we must object to

the approval of any lens designed to eliminate the dazzle and glare so long as it is made in color. If an automobile owner has no intention of remaining in New Jersey he can travel through the state without fear of arrest."

NEW HAMPSHIRE SPEED LAWS.

The public service commission is calling attention to the motoring public of the law passed by the 1917 session of the Legislature requiring the reduction of the speed of motor vehicles to 10 miles an hour on approaching railroad crossings. All towns have erected beside all highways, within 400 feet of every grade crossing, signs calling attention to location of such crossing. It is claimed that if the law is complied with there will be no excuse for accidents at any of the grade crossings.



Review of Four Years of Association Work

Nine Thousand Copies of Literature Issued a Day Estimated to Reach 2,000,000 People—Statistics of Work Shop and Library

Some of the great educational work in which the National Highways Association is engaged may be gleaned from the following statement of the association's activities:

The fourth year of the work of this association ended on March 9, 1917, and a summary of the operations during these four years is as follows:

1. The numbers of different editions of maps, pamphlets, bulletins, circulars, etc., issued by the association amount to:

1912, 214; average per week, 4. 1914, 155; average per week, 3. 1915, 217; average per week, 4. 1916, 4,165,113; average per day, 14,000. Total, 790; average per week, 4.

 Total known editions of these different maps, pamphlets, bulletins, circulars, etc., enumerated above, of which the association has been able to obtain a record are:

1913, 3,306,113; average per day, 11,000.
1914, 672,401; average per day, 2200.
1915, 2,162,449. average per day, 7200.
1916, 4,165,115; average per day, 14,000.
Total, 10,306,076; average per day, 9000.

3. The total possible maximum editions of these maps, pamphlets, bulletins, circulars, etc. The record of these it is impossible for us to obtain, as many recipients will not make a return even though publishing the matter forwarded to them. The observer can take any percentage he thinks fair to arrive at the probable audience of the literature issued by the National Highways Association.

1912, \$50,900,607; average per day, 1,800,000.

1,800,000, 1914, 76,138,651; average per day, 250,000, 1915, 236,275,499; average per day, 800,000, 1916, complete record not kept over 1,000,000,000; average per day, 4,000,000, Total, complete record not kept over 2,000,000,000; average per day, 2,000,000. 4. Total communications sent out, received and answered in correspondence department at "work shop" and executive offices only. This does not include national headquarters, New York, Washington offices, or any of the 200 departments and divisions of the association.

1913, 109.416; average per day, 365. 1914, 51,550; average per day, 171, 1916, 68,912; average per day, 229, 1916, 596,535; average per day, 1988. Total, 826,418; average per day, 688.

5. Pieces of stationery purchased for the use of the association during this period:

1913, 1,273,400; average per day, 4245, 1914, 364,577; average per day, 1215, 1915, 300,000; average per day, 1000, 1916, 1,126,966; average per day, 3756. Total, 3,124,943; average per day, 2604.

In addition to the above work the library of the National Highways Association (said to be the most complete in this or any other country) at Columbia University, has been maintained up to date and very large additions thereto have been collected at our South Yarmouth workshop. The Du Pont-Davis Road Photograph Competition, together with many other additions, has given the association a remarkably fine and probably the largest collection of road photographs in the country. To these will be added the bhotographing of America, now being done, and which will take about two years. This work is undertaken under the auspices of the association in co-operation with the Department of the Interior and the Combitone Pictures Corporation and Pathe Exchange, Inc. The mapping of the United States, occupying the last four years, is nearing completion, and the U.S. tour book of the association will be likely to be published during 1918. The association now has over one hundred and twenty-five (125) state, national and alignment good roads organizations affiliated with and acting as departments and divisions thereof. We have seventy (70) divisions organized in our council of national advisors. They represent many social and industrial activities of the body politic, and in their personnel include many "men of recognized ability and eminence in the arts, sciences and letters." Our council of governors and council of commissioners now represent every state in the Union.

MONTREAL-OTTAWA.

Motorists touring between Montreal and Ottawa are advised to go via Malone, N. Y., to Ogdensburg, crossing the ferry to Prescott and over a fair country road to Ottawa.

ROAD CONSTRUCTION.

The Berlin turnpike to Meriden, Conn., is now open.

The road from Greenfield to Shelburne Falls and north to Keene, N. H., is in good condition. From Sheffield to Pittsfield via Jacobs

Ladder is also in good condition; but between Pittsfield and Albany there is a bad detour.

From Saybrook, Conn., to New Haven via Middletown the highway is in good condition; but between Enfield and Warehouse Point the road is still torn up.

On the road from New Haven to New York there is a bad detour lying between Bridgeport and Milford.

Between Boston and Worcester there is a bad stretch of road at Shrewsbury.

The road between Providence and Springfield via Palmer and Southbridge contains a bad detour between Southbridge and Webster.

Some Police Activities in Eastern States

CLINTON, MASS. The police of this town have been ordered to enforce the speed laws on High and other streets.

GLOUCESTER, MASS. Considerable complaint is being made against fast driving of motor vehicles in the city of Gloucester and the police have been ordered to strictly enforce the law.

FOREST HILLS, MASS. The police of the Jamaica Plain station are arresting motorists who fail to observe the orders or instructions on the sign attached to the elevated structure which directs motorists to go to the right.

LYNN, MASS. The police are arresting motorists who approach street cars nearer than eight feet.

WORCESTER, MASS. Owing to numerous complaints received of fast and reckless driving of motor cars along Milbury street, Quinsigamond, the speed laws have been ordered strictly enforced.

LONGMEADOW, MASS. A campaign has been begun against fast driving of automobiles through this town and also against the opening of muffler cutouts. A number of arrests have already been made.

NEWBURYPORT TURNPIKE. So many accidents have occurred and such fast driving has been indulged in on this turnpike between Danvers Highlands and Topsfield as is likely to compel the stationing of officers thereon to secure a compliance of the law.

MARLBORO, MASS. The police authorities are making arrests of violaters not only of the state laws, but all new traffic regulations recently adopted by the city council. Much complaint is heard against parking cars on the main streets all night and all day, and in certain cases cars standing in front of stores are being washed in the streets.

SWAMPSCOTT, MASS. The police are arresting overspeeding motorists on Paradise road—the main state highway between Swampscott and Salem. Motorcycle police are patroling this road between the railroad bridge and Burrill street; also on Humphrey street.

IPSWICH, MASS. The police of this town are making arrests of overspeeders.

BEVERLY, MASS. The police of this city are making many arrests of overspeeding motorists not only during the day, but during the night time, in the vicinity of the North Beverly station on the main state highway running from Beverly to Gloucester.

DRUNKEN DRIVERS IN MAS-SACHUSETTS.

A vigorous campaign for the elimination of drunken and reckless operators who show insufficient regard for the safety of the public has been determined upon by the Massachusetts Highway Commission and will be put into operation at the earliest possible moment. A number of new investigators have been appointed and it is expected that they will soon begin the performance of their duties.

The new rule of the Massachusetts

Bulletins of New Traffic Rules and Notice of Speed Traps Being Operated in a Large Number of Cities

Highway Commission is likely to have good effect. Hereafter a man convicted of running a car in Massachusetts while he is under the influence of liquor must not only take the pledge and keep it for a year, but he must obtain a position with a respectable employer and so generally conduct himself for a year that the employer will be willing to give him an indorsement of his conduct to the Highway Commission; then, if all things are equal his operator's license will be returned to him. A second conviction, however, will doubtless make it next to impossible for him to obtain a license again.

NEW YORK SPEED TRAPS.

Speed traps in various municipalities in northern and central New York have been established and many arrests are being made in Jefferson county of motorists who drive through the municipalities at a speed exceeding 15 miles per hour.

ELMIRA, N. Y. The police department of this city has ordered a strict enforcement of the new state wide traffic law.

NIAGARA FALLS, N. Y. The highway laws are being strictly enforced by the police of this city. Motorcycle police are making many arrests.

IN RHODE ISLAND.

WOONSOCKET, R. i. The police of this city are holding up motorists for violation of the motor vehicle automobile laws, ordering them to appear at the police station for the purpose of full identification, and while no arrests have been made the offenders are given to understand that any further violation of the law means prosecution.

NARRAGANSETT PIER, R. L. Automobile laws with respect to speeding, careless driving and the proper display of lights have been ordered strictly enforced by the chief of police of this town.

MAINE SPEED TRAPS.

A revival of speed traps is taking place in many of the cities in Maine: South Portland, Scarboro, Gray, between Biddeford and Portland, and between Portland and Poland Springs, near Dry Mills and Rockland.

A great deal of complaint is heard on every hand by non-resident motorists of Maine against the unjust discrimination in these arrests. We alluded to this matter in a previous issue of this journal, but there seems to be little, if any, abatement of the despicable methods adopted by the police patroling many of the Maine highways. The following is a sample of numerous complaints: "I had been following a Maine car for several miles," said a non-resident tourist, "when out from the side of the road jumps a sheriff and his deputy, holding me up, charging me with violating the law and

there was nothing for me to do but to furnish bail for the appearance of my chauffeur in court on the following morning. Strange as it may seem there was a bail commissioner right on hand, who received \$5 to allow our party to proceed to the railroad station. boarded a train leaving Maine, but our chauffeur was obliged to remain behind. The first thought was to fight the case, but upon reflection this would necessitate a greater expenditure of money, a loss of pleasure and a consumption of considerable time. There was little to do, however, but to hold up our hands and let the authorities pick our pockets."

CONNECTICUT.

BRIDGEPORT, CONN. Considerable complaint is being heard against the fast and reckless driving of automobiles in various parts of this city and a strict enforcement of the law has been ordered.

NEW HAVEN, CONN. A complaint has already been made relative to the fast driving of cars on the fine new driveway through Edgewood Park, along the east bank of the West river, extending from Chapel street to Whalley avenue, in Westville. This road has been about four years in building and is considered a very fine stretch.

STAMFORD, CONN. "Stop" and "Go" signals are to be placed at Atlantic square and at Main and Pacific streets.

WILLIMANTIC, CONN. The police have been ordered to arrest all motorists driving at an unreasonable rate of speed on lower Main street and West Main street, in this city.

JAY WALKERS.

"Stop Jay Walking." That is one of the orders to the police of Kansas City, says the Worcester Telegram. A jay walker is one who walks across a street at the right place, but at the wrong time or across a street on the bias or at the wrong place at any time. Then a jay walker is one who pays no attention to anybody else or to his own safety in crowded thoroughfares, The automobile is the last straw which established odium for the jay walker. But other vehicles help the autos crowd the streets. They have the anti-jay walker fever so hard in Kansas City that the chief of police has ordered the officers to give the jays only a week more to reform under special instructions, and

then arrest them for disturbing the peace. The officers say they have the most trouble with women of age, because they persist in going wrong in the crowded streets, and they give all observers heart failure to such an extent that it is next to impossible to regulate the traffic. And the busy man is the next most persistent nuisance. He goes any way to get across and it is not enough that he generally goes safely. There is always the doubt and it confuses, other pedestrians and the people riding as well as the traffic officers.

Two Popular Tours Out of Historic Boston

NE of the most delightful and interesting motoring trips in the eastern part of the states is that from Boston to Greenfield, to North Adams, over the Mohawk Trail; thence south to Pittsfield, through the Berkshires to Springfield and back to Boston via Worcester. We are presenting here-with a detailed description of this tour:

BOSTON TO GREENFIELD. 99 Miles.

State Road All the Way. (Follow Red Banded Poles.)

From Boston run out over Harvard bridge to Cambridge, curving right around Harvard on Massachusetts avenue.

around Harvard on Massachusetts avenue.

Keep left at fork and go over railroad.

6.9 ARLINGTON.

8.6 ARLINGTON HEIGHTS.

12.0 LENINGTON. Curve left, away from trolley. Left at fork on Lincoln avenue. Right at fork on the Lexivery road. Left at fork and took and

avenue. Right at fork on the Lexington road. Left at next fork and right at three corners. CONCORD. Join trolley. Right at fork, away from trolley. Right at fork on Elm street. Fork, curve

cight to

NORTH ACTON. LITTLETON COMMON. Left at fork. Right at library. Pass cemetery and at fork keep left and right at next

at fork keep left and right at next fork. Go over railroad. Curve right at fork over bridge into AYER. Take right hand road beyond railroad, leaving trolley. Turn left. Fork, keep left, over railroad. Go over bridge and keep right at fork. Right at next forks to LUNENBURG. Water trough, right, into Main 3t.

into Main St. Water trough, left, 47.7

into River street. Left at irregular four corners, under bridge. CROCKERVILLE. Water trough, CROCKERVILLE. Water trough, right. End of road, right. WESTMINSTER. Straight ahead. 51.0

65.0

Left at fork.

Left at fork.
SOUTH CARDNER. Right with tracks at water trough.
GARDNER. Left beyond railroad bridge. Left onto Main St.
W. GARDNER. Left on Parker St. Right on West St.
OTTER RIVER.

65 2

DITTER RIVER.

BALDWINSVILLE. Left at end of rond. Water trough, right on Maple St. Left, over bridge.

ATHOL. Left at fork into School St. Left at end of street on to Mystic St.

ATHOL. Cross iron bridge, curve left at three corners and go over two railroads.

two railroads.
ORANGE. Straight on,
ERVING, Keep left at fork. Left
at end of road. Left at four corners.
MILLER'S FALLS. Right at four
corners. Right at fork and right
at end of street Right hand road.
TURNER'S FALLS. Left at end of
road. Right hand road. Water
trough, left into High St. Right on
Main St.

95.5 Main St.

GREENFIELD. 99.0

GREENFIELD TO NORTH ADAMS.

36.7 Miles.

GREENFIELD. Main St. Run west and at water trough curve left over bridge. Four corners, right. SHELBURNE. Right at fork. Left

SHELBURNE LALLS. Right at end SHELBURNE L.LLS. Right at end of road. Right at fork and left at next fork. Right hand road CHARLEMON'T. Right hand road. Mohawk Trail grarts. WHITCOMB SUMMIT. Down grade and then turn left. Meet trolley and curve left.

17.7

One is Through Beautiful Country Over the Mohawk Trail-Another Out the Old Newburyport Turnpike

36.5 Right hand road. End of same, left Right at four corners on Eagle St. into Main St.

NORTH ADAMS.

NORTH ADAMS TO PITTSFIELD.

22 Miles.

NORTH ADAMS. Right on Ashland St., with trolley under railroad. Pass cometery. Trolley leaves. Right over tracks. At waiting sta-At four corners turn left. Trolley.

ADAMS. Curve slightly left on Main St., following trolley. Go over railroad and small bridge. Then turn right with trolley on Commercial St. Bear right over bridge. Theft and comes in again. Trolley goes

CHESHIRE. At furk, curve left, away and over trolley. Go over railroad and bridge, meeting away and over trolley. Go over railroad and bridge, meeting trolley from right. Go over railroad. Trolley goes left. Go by Berkshire postoffice. Bear left down hill. End of road, right, on macadam. At four corners, right, following trolley. Go over railroad bridge. Water trough, right, with trolley. Hospital ahead, turn left on North St. with tracks to

North St. with tracks to PITTSFIELD. PITTSFIELD TO SPRINGFIELD.

56 Miles.

0.0 PITTSFIELD.

PITTSFIELD. Run south with tracks on South St. Right at fork. LENOX. Square left at monument. Left at stone church. At fork curve LENOX. Square left at monument. Left at stone church. At fork curve right on fine macadam. End of road, turn left, over bridge. Water trough, turn right and follow trolley. Left at end of street with trolley. Take right hand road, following trolley. Left at fork.

E. LEE. Straight ahead. Jacob's Ledder commences.

Ladder commences.
BONNYRIGG FOUR CORNERS.
CHESTER, End of road, turn left.
Turn left under railroad and right 28.0 beyond. HUNTINGTON.

RUSSELL. Wooden church, turn 39.0

WORONOCO, Franklin St. At the end of street (large elm), right on Elm

St. WESTFIELD. Square left on Main St, with branch trolley. Left at fork. Three corners, right, meeting trolley. Right at fork, bearing left into

w. SPRINGFIELD. End of street. right with tracks on Elm St. Square left at four corners. SPRINGFIELD.

SPRINGFIELD TO WORCESTER. 51 Miles.

SPRINGFIELD. Rallroad arch, Run south on Main St. Masonic Temple. Left with trolley on State St. Water trough, curve left. Fork at ceme-

NORTH WILBRAHAM, Caution, Left under railroad and at once square

PALMER. Square left on Thorndike St. Sharp right on Park St. WEST WARREN. Three corners. 15.5

WEST

WEST WARREN. Three corners, right, down hill.
WARREN. Right. Irregular four corners, left, following trolley. Curve left over narrow bridge, bearing right over bridge. Right at end of road. Left with branch trolley.
WEST BROOKFIELD. Right with branch trolley, Right at fork.
BROOKFIELD. Inn, turn right. End of road, left, following trolley. EAST BROOKFIELD. Right at fork,

30.6 33.2

SPENCER. Right at fork and bear 40.0

left down hill to LEICESTER. Straight on to 45.0

CHERRY VALLEY. WORCESTER. 51 0

WORCESTER TO BOSTON.

43 1/2 Miles.

WORCESTER. Southeast on Front St. Washington square, straight through following branch trolley.

through following branch trolley. Fork, left on Shrewsbury St., curving right into Belmont St. Water trough, left, following tracks. SHREWSBURY. Left at fork. NORTHBORO. Water trough. Right, following trolley, over railroad at station. Go Straight ahead when trolley leaves. Left at end of road into W. Main St.

MARLBORO. Curve right into Main St. Left at fork, with tracks, Water trough, right on macadam. Turn right at three corners. Curve right into Main

SOUTH SUDBURY. Right at fork, WAYLAND.

26.5

WESTON. Right at water trough and immediately right on School St. Curve slightly right into Wellesley St. Left, Newton St. Diagonal four 29.8 corners, left on Commo left on Commonweilth Ave.,

AUBURNDALE, NEWTON.

37.0

BROOKLINE to

43.4 BOSTON.

A PICTURESQUE HIGHWAY.

One of the most unique as well as one of the most picturesque highways in Massachusetts, if not in all New England, is the old historic Newburyport turnpike. This highway runs straight across the country from Everett to Newburyport, up hill and down dale, through most beautiful rural scenery, still avoiding all industrial centres. If it were a macadam road this highway might easily suggest one of the splendid highways in France, at least with regard to its straightness and attractive contiguous country. It is a good dirt road, however, very comfortable for motoring, and is the most direct road from Boston to Newburyport and

It is hoped that the time may be not far distant when we shall see this turnpike one of our great boulevards connecting Boston with the seashores of New Hampshire and Maine.

The following is a more or less detailed description of this highway:

BOSTON TO NEWBURYPORT.

(36 Miles.)

Macadam and Gravel Road.

6.0 BOSTON. Run out over Harvard bridge to Cambridgeport. Right on Columbia street, away from trolley. Meet trolley. Left on Broadway. Four corners, right on Prospect street. Five corners, meet trolley. left on Webster avenue. Go over bridge into SOMERVILLE. Straight

SOMERVILLE. Straight ahead. Church, turn right up hill. Walnut street. Go over bridge and cross Brosdway. Middlesex Fells Park-Broadway, Middlesex Fells Park-way, Go over drawbridge. MEDFORD, Right on Revere Beach

Parkway. Go over bridge and draw-

EVERETT. Left on Broadway and keep left. Go over Main street trolley.

LYNNFIELD, Straight ahead. over two railroads—State street. Straight ahead through four corners.

co U

NEWBURYPORT.

























Wise to Avoid Waste of Gasoline

N. A. C. C. Plea to Motorists and Manufacturers

The National Automobile Chamber of Commerce, in a bulletin to members, entitled, "Suggestions for Constructive Publicity," and signed by General Manager Alfred Reeves, states that gasoline abould be economized and waste avoided.

"However, processes for extraction of increased percentages of gasoline from crude oil are being put into extensive operation," continues the bulletin. Kerosone can be used successfully if necessary and there are a number of kerosene carburetors on the market. Government reports show almost unlimited deposits of oil bearing shale in western states from which large quantities of gasoline can be extracted. Many oil wells in Mexico are still capped. Alcohol can be used as a gasoline substitute or in combination with it. Any farmer can distil alcohol from waste products at small expense if certain legal restrictions are removed. Distilleries that suspend manufacture of whiskey can make alcohol in large quantities from sawdust and other wastes."

In reference to a suggestion that the motor car should be called a passenger car or automobile and not a pleasure car, the bulletin in support of this argument cites the following facts:

"The automobile fills a real transportation need. It is estimated that 40 per cent. of the motor cars in America are owned and used by farmers. There are three times as many automobiles in Iowa, Nebraska and California in proportion to population as in New York state, Massachusetts, Pennsylvania or Illinois.

"The increase in car sales has been several times larger in agricultural states during recent years than in manufacturing states. Doctors, traveling salesmen, highway officials, municipal department heads, contractors and build-ors, and men engaged in many other lines find the automobile indispensable in their work and by its use save many hours daily.

"Wholesome recreation in the open air is a great revivifier and invigorator. It enables the hard working business man to continue intense effort without breaking down. President Wilson takes his recreation in an automobile every afternoon."

In speaking of the great service that the motor car is rendering people in this country, the bulletin states that greater passenger mile service is given by the passenger automobiles in the United States than by the entire railroad or street railway systems of the country. The 3,700,000 passenger cars, averaging 5000 miles a year and three persons each, give a total of 55,500,000,000 passengermiles. At the rate of two cents a mile this service is worth \$1,100,000,000 a year.

The letter includes sound advice to the manufacturers on the co-operation that should be given to the chamber's proposed campaign of constructive pub-

licity to atem the current of harmful newspaper comment. The items which it designates as likely to do serious harm are specified as "misleading, untrue and purely speculative ones, injudicious criticism, such as the purchase and use of automobiles being an unwarranted extravagance, the likelihood of shortage in gasoline causing suspension of use of cars, possible commandeering of cars and trucks by the government, etc." The chamber has assurances that there will be no commandeering. It insists so strongly that reports of "stunts," speed runs, tremendous profits, etc., constitute a form of publicity that may not be of real interest to editors and readers that a chorus of editors and readers may almost be heard shouting "Amen!"

FORD LIGHTING SYSTEM.

A three-unit lighting system for the Ford car, called Genolite, marketed by the Detroit Starter Co. of Detroit, manufacturers of the Vestal Products, is designed entirely independent of the regular Ford magneto system and consists of a generator, a storage battery and a special controlling and dimming switch mounted on the steering column. All units are designed according to accepted automobile practise and contain the latest features of car lighting systems.

The generator is of the square type and is mounted on a stamped steel bracket, which can be attached very easily without any machine work or altering of the engine. The output is six volts and the generator begins charging at a car speed of about nine miles per hour; at 13 miles per hour speed seven amperes are generated. The voltage is kept constant by the Ward-Leonard regulator and the current is used for charging the storage battery, which has a capacity of 40 ampere-hours and is mounted in an attractively enameled box on the running board.

The dimming switch, which is accessibly located on the steering post, has three positions, high, low and off. The headlights being controllable for bright light for touring or dim for city driving.

Included with the outfit is sufficient wiring for the whole system, and two special nitrogen bulbs for the headlights. These bulbs are special and are fitted with two filaments, which make the dimming possible somewhat after the well known Hi-Lo principle.

In addition to the lighting system the outfit makes a practical installation, because it can be used for ignition as well. This, in addition to the regular Ford magneto ignition, makes a positive ignition system at all times and under practically all conditions.

The outfit may be purchased complete as above described for \$38.85, and for those desiring but the generator alone the outfit, less the storage battery, at a price of \$28.85.

MAINE WILL PROTECT MOTORISTS AGAINST EXTORTION-

Fearing that the State of Maine would be placed on the black list by motorists from other states owing to the mulcting of tourists by unscrupulous sheriffs and town constable, the Maine Automobile Association is taking steps to prevent unwarranted persecution of travelers over the roads before these unsavory activities have given the state a bad name throughout motordom.

The present situation arose from the fact of a joker slipping into the highway law providing that, "bail commissioners must appear and bail must be furnished for the appearance in court of the offending automobilists." Many speeders were arrested and usually fined \$20 after the law went into effect and testimony in these cases indicated that the men clothed with the authority to carry out the prosecutions showed exceptional zeal in arresting mainly motorists from other states. It also appears that through some peculiar coincidences in many cases, bail commissioners have happened right on the spot when an arrest was made, prepared to do business. Drivers in other instances have been obliged to give up money, watches or other valuables as a guarantee of their appearance in court.

Maine's new headlight dimmer law for automobiles and electric cars is effective Aug. 15. There is a ruling limiting the candle power of automobile headlights to 24. Spotlight use is restricted to right, left or rear of car, and when stationary.

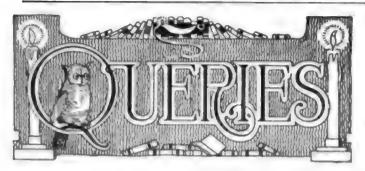
THREE BUYERS FOR PULLMAN COMPANY ASSETS,

The Pullman Motor Car Company's plant at York, Pa., the equipment and finished product and service department. with stocks, has been sold to three separate parties. Theodore Friedeberg. president of the Lozier Motor Company, purchased the plant and site on which it stands. No announcement was made regarding the use to which it will be put, but it is understood that he was acting for New York interests in the purchase. The land and buildings brought \$43,000, and \$197,000 was paid for the remaining assets, not including the service department, which was sold to Louis Goldstein & Sons of Philadelphia for \$115,000, and 97 completed cars, which were bought by Daniel S. Dwyer of New York for \$53,597.

The total sum realized, it is believed, will enable the receiver to pay all creditors and leave a balance sufficient for the payment of a 10 per cent, dividend in liquidation to the common stockholders.

PRICE OF FORD CARS WAS NOT ADVANCED.

The rise in the price of the Ford cars which was generally expected on the first of the month did not materialize, although it is reported on fairly good authority that an increase may be announced at any time.



NOTICE TO READERS,

THIS department contains the Mechanical Helitor's unawers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars, do not hesitate to lay your troubles before him. He will answer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should always be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more wideapread interchange of ideas. To this end the attention of readers is invited to the following question:

DO YOU THINK THAT THE PRACTISE OF RUNNING IN CAR TRACKS IS INJURIOUS TO TIRES AND WHY?

To the writer of the best answer to the above question \$2.50 will be paid. The best answer received will be published in the second issue after the appearance of the question in the magazine. Answers to the question should be in the hands of the editors by the 5th of September. The contest is open to every subscriber.

ADJUSTING THE BRAKES. (Mr. D. E. Janson, Providence, R. I.)

The brakes are one's best friends in case of emergency, yet few drivers realize what importance the conditions of the brakes bear to the safety of the passengers. It is every driver's duty to other traveling motorists, as well as to himself, to keep his brakes in the best order possible while he is driving on the public roads.

An examination of the brakes should be made at least once every week and adjustment made if necessary. The rear wheels should be jacked up and the emergency or hand brake pulled up until the bands begin to bind on the drums. Then each wheel should be turned by hand and the friction of the bands on the wheels compared and adjusted so that they may exert approximately the same pressure upon each drum.

The service brake should be examined and adjusted in the same way.

If the adjustments are not obtained easily the condition of the bands should be noted. Grease leaking through the felt washers in the axle housing or past the axle bearings often causes serious trouble because the brake cannot be relied upon when it is oil or grease soaked. For this reason, should the grease exudations be copious the cause should be removed and the felt washers replaced.

Another cause of trouble which is more noticeable with the external brake is the gathering of dirt. The external bands should be cleaned frequently.

The brake rods should be inspected often, as they frequently are bent. They should be straightened and read justed. The brake lining should be watched and as soon as evidences of wear are apparent the fabric should be replaced. Should the lining become glazed or smoothed from the action of heat and grease it may be cleaned with kerosene and a stiff brush. The use of a good fabric is to be recommended

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TRUCK SPECIAL

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Comes in 60-yard rolls 50 inches wide. Cuts in multiples without waste.

You should use it to save money.

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It is waterproof, washable and its fine leather appearance and "feel" leave nothing to be desired.

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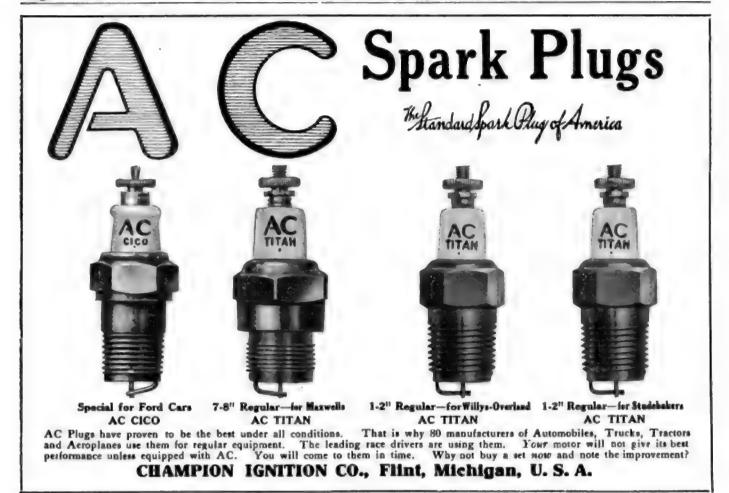
World's Largest Makers of Leather Substitutes

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not to cut off too much of the surfaces.

The repair of broken down coils or condensers is a factory job and cannot be successfully accomplished without proper tools and equipment.

After long use a valve spring is apt to loose its springiness and thus the valve action is impaired. A skip in one cylinder may often be traced to a weak exhaust valve spring. To locate such weakness, insert a screw driver between the coils of the spring while the engine is being run and expand the spring. Should the engine immediately speed up, and run evenly, the valve spring should be replaced by a new one.

The valve guides of the "missing" cylinder should be given a careful examination, as excess air leakage into the cylinder will cause a weakened mixture and consequent misfiring.

If the skip effects all cylinders, examine the breaker box or timer and be sure that all primary connections are electrically perfect. The possibility of broken wires inside the insulation in the primary circuit is also to be considered. All of the coils should be carefully tested and their connections inside the box examined. Loose binding posts often cause considerable trouble.

The carburetor manifold should be carefully examined, both where it is joined to the engine and at the carburetor. A leakage at either of these points means a poor mixture, causing a skip.

A clogged fuel intake line, or poorly vented tank, both result in a skipping engine. Pieces of packing often lodge in the fuel line, forming valve like shut offs, which are hard to locate, since the gasoline will seep through them, yet not run in a sufficient quantity to keep the engine supplied.

Water in the gasoline, or dirt in the carburetor will cause trouble. The best remedy is to disassemble the carburetor and clean it thoroughly.

Since you did not tell us the make of your car we cannot give you the carburetor adjustment. We would suggest that you be sure that it is properly adjusted before you try to locate the trouble.

DIRECTIONS FOR CLEANING BATTERY.

(R. G., Boston, Mass.)

I should like to clean out my storage battery because there is quite a lot of sediment in the bottom—so much in fact that I am afraid of short-circuiting the plates. Can I turn the battery upside down and pour out the electrolyte and sediment without damaging the battery?

The turning of the battery upside down to remove the sediment would not be practical and would probably be very injurious to the battery. The sediment of which you write is lead peroxide that has been "shed' from the positive plates and precipitated.

If the battery were inverted to pour out the electrolyte the sediment would be washed between the plates and separators and around the plates so that short circuits would result. No washing that would be practical would insure the removal of the particles from the plates, and in the event of renewal of the electrolyte, particles remaining on the plates would result in local action—each particle having a polarity opposite to that of the plate on which it would be fixed, and forming in each instance a miniature cell in which charge and discharge would alternate, as between positive and negative plates. Eventually holes would be pierced in the plates from this action.

There is but one way to clean the sediment from the cells, and this work is not often undertaken by one not experienced in battery repair. It is the removal of the plates from the cells, thoroughly washing the plates and jars, renewal (if necessary) of the wood separators and reassembling.

Before this is done the battery should be fully charged, which means that it should be charged until there is no rise in voltage or specific gravity of the electrolyte over a period of half an hour.

The battery cells have two terminals each and these cells are connected by different type connectors, some being what is known as "bolted" and others being "burned." The process

(When Writing to Advertisers, Please Mention The Automobile Journal.)



should be an allowance for temperature variation, for the specific gravity will decrease one point for each three degrees rise in temperature and it will correspondingly increase for each three degrees fall in temperature.

The maximum gravity will be approximately 1.280 at 80 degrees Fahrenheit, and the maximum voltage should be between 2.55 and 2.70. Upon completion of the charge the height of the electrolyte should be adjusted to be about onehalf inch above the tops of the plates. The battery will not have its maximum capacity until it has been charged and discharged three or four times, when the specific gravity of the electrolyte should be adjusted to be approximately 1.285 when fully charged.

The restoration of a battery is a very delicate operation and in most cases it is most practical for the owner to have the work done at a battery station. Unless the most careful attention is given the work the results will be disapointing.

Giving the Used Car a Chance. (Continued from Page 9.)

environment in his home to the satisfaction of all his family. Sunday no longer finds him sitting about the house all day and indifferent to his surroundings, but out in his car with his family, enjoying the refreshing air and country scenery. It is a new and healthy life that he has entered together with his family and they all become attached to the car regardless of his pedigree or embellishments. Here is a man that is getting all the fundamental pleasure and enjoyment that it is possible to derive from motoring.

He builds a garage for his car after finding that it is cheaper and more convenient than placing it in the public garage and in his spare time becomes absorbed in the interesting work of caring for his machine, making adjustments, minor repairs and cleaning it up. In this process all the imaginary troubles that confronted him before he became an owner disappear and he is transposed into a motoring enthusiast with the assurance that he will remain one until his death unless misfortune overtakes him. Thinking of gears, transmissions, carburetors, magnetos and other seemingly mysterious mechanisms no longer baffles his reason, but serves to stimulate his interest and he will soon be talking "car" almost as fluently as he discusses his business.

And It Could Have Happened Sooner.

Here is an individual, now a potential part of the great market for motor cars, parts and equipment, that might have been a factor several years earlier had anyone taken the trouble to educate him up to the pleasures of motoring and to dispel his doubts regarding the operation and maintenance of a machine. His ignorance of the subject kept him out of the game and in all his visits to dealers he found none who understood his attitude so that they could apply the convincing argument that would make him a motorist.

The ownership of a car with him is now indispensable; he no longer looks upon it as an expense or possible waste, but goes to the other extreme in most cases and buys all the necessary accessories that he can afford. When he got his car it had been stripped of about everything except the necessary running units. For a time it proved satisfactory in this condition, but he soon learned to appreciate the value of a spotlight, an extra tire and rim, engine tire pump, one man top, self-starter and numerous other appliances that lessen the care and make more pleasureable the operation of a car.

With full equipment and a new coat of finish on his car he is still several hundred dollars in pocket and possesses the same value in a motor car that another owner who had purchased the same make and model of car new. His car develops the same speed, has the same riding qualities and he can tour as extensively as he wishes. When the time comes and conditions warrant the purchase of another car he will probably want a new one and when he decides to act on this desire he will no longer haunt the salesrooms, using up the dealers' time and causing them untold disappointments, but will buy quick.

This suppositionary case reveals a factor in the motor trade that has too long been overlooked and one that must receive immediate attention to bring about a more healthy condition in the market for new cars.

Friction starts Grinding before Grease begins Lubricating

Common grease needs heat to soften it before it can lubri-The parts grinding together must furnish this heat in the shape of friction. Meanwhile these parts get no lubrication. And Friction-getting a good start-is never caught up with by greage.



Instantly-and

NON-FLUID OIL lubricates the second your car moves from rest-and every minute it is in motion. Doesn't give friction a chance to start. It never melts, never leaks out, is much purer and longer lasting than any grease you can buy.

If you buy lubricants on the same basis that you buy tirespurely on service, you'll ask for NON-FLUID OIL every time. Get "K-oo Special" grade for pears; "K-ooo" grade for bearings. Sold at your dealers in orange-colored cans only.

> Write for a free booklet, "Lubrication of the Motor Car.

New York & New Jersey Lubricant Company 165 Broadway New York City

Winton Six

The Winton Six is a car of high ideals. Every ounce of material and every stroke of workmanship in it are honest. It is made by artisans encouraged to excel. It is made for men and women who love and value sterling worth in manhood, in womanhood, and in the things that make living so delightfully worth while. It is made for you.

Write today for catalog

THE WINTON COMPANY 131 Berea Road, Cleveland, Ohio



It is a well-known fact that Paige Dealers are among the biggest money makers in the The Most Booutiful Car in formion motor car field. An inspec-tion of the Pauge line will explain why.

Write for complete particulars

PAIGE-DETROIT MOTOR CAR CO.,

Subscribe to THE ACCESSORY AND GARAGE JOURNAL PUBLISHED MONTHLY

Times Building

Pawtucket, R. I.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



















Are You the Man?

We are looking for one man, a man of exceptional ability and initiative. Some one man, above all others in every community, has the particular ability we seek. When we find him, he will immediately begin to build, with our aid, prestige and profit for himself.

He will be the highly capable representative of a highly capable motor truck. Little Giant.

He will be backed by a world-spanning organization, that has 23 years' reputation and experience in the building of engineering tools and machinery. He will be backed by the record that thousands of their trucks have made in over 175 varied types of business endeavor. He will be backed by the proof of service that many of these trucks have given for over nine years. He will be backed by intensive

local newspaper advertising over his name, in his territory. He will be backed by a truck, whose specifications set so high an efficiency standard, that it represents the most desirable hauling-equipment purchase that can be made by men who have things to move. He will be backed by a complete line 1-Ton, 2-Ton, 31/2-Ton, and Const vert-a-Car (Ford truck unit); and their extra exclusive cost-cutting feature—the Duntley Hydro-Pneumatic Gas Generator, which burns half kerosene and half gasoline, cutting fuel cost in two.

Write today, or better still, telegraph your belief that you are the alert, progressive, capable man we want; that you can ably represent in your community the Little Giant Tracks with the habit of heavy performance. Made that way by the \$14,000,000

CHICAGO PNEUMATIC TOOL CO.

621 Little Giant Building

1615 Michigan Avenue, Chicago





HE car owner will find in this issue of the magazine information of practical worth from the frontispiece, with its serviceability argument to the novitiate, through the special treatment and disassembly of a popular car, to finis on the last advertising page. There is reason to all things and there is exceptional reason in this era of critical trial for the automobile that its exact standing shall be determined and fairly determined in the house of its friends. The dependence of the generation has passed decidedly from the horse to the automobile. It is not on test in any sense as to its fitness for survival as the great mainstay of road transportation. The ordeal for cars today is simply to stand up until owners, dealers and manufacturers perfect complete trade organizations and trade practises that will give the vehicles a fair chance for their inherent values. The manufacturers require to be kept in immediate touch with the motoring public. Some observers maintain that there is a large class of distributors whose chief interest lies in sales and who are necessarily not so greatly in sympathy with users as the people who actually make the vehicles. The user, in the last analysis, must place all his dependence in the machine. The value that is in it is exactly what there is, for buyer or seller, to trade on, and so a sliding scale based on the year of its make is worthy of absolutely no reliance, is no no wise a help, and should be abolished.

THE more the used car problem is studied, the more apparent does it become that united trade and owner action is easential. In a forthcoming issue soon the Automobile Journal will present facts on the used car problem and discussion of this view. Every motorist has a great deal at stake. Send in your opinion. XLIV. AUG. 25. NO. 2. TEN Facts on Car Serviceability..... 9 A Strong Argument Against Set Price Depreciations. Used Car Quotations......12 Restoration of the Overland.....14 Fourth Article Treating of Mechanical Overhauls. Automobile Engine Cooling....17 By A. K. Schanze. Comprehensive Study Subject in S. A. E. Paper, National Automobile Association 23 Mileage and Hourly Rates of an Operating Cost Study. National Highway Association. . 25 Motoring Fashions......27 By Mrs. A. Sherman Hitchcock. Describing Holley Vaporizer....29 Garages—Plate VII...........30 Automobile Journal Design for a Three-Car Storage. The Misnamed "Pleasure" Car., 32 By Alan Phillip. Westcott Series 18......33 Racing at Sheepshead......34 Accessories and Equipment....36 General News of the Industry...38 Queries-Idea Exchange......40 -:::-Treasurer . . WILLIAM H. BLACK Secretary . . . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO.

Times Building, Pawtucket, R. I.

PATRIOTISM, with a good many people, stops short of practical sacrifices that will help win this war and decide that the world shall be safe for democracy. One of the sacrifices which hits our 100,000,000 people in the same vulnerable spot is that which calls for food conservation. The bureau of trade and technical press publicity in the department of food conservation administered by Herbert C. Hoover seeks to enlist the men. women and children who must be reached, not once, but several times as willing volunteers through the periodicals they read. The campaign is launched to conserve food, fuel and power. All motorists, as well as all readers of this magazine engaged in the automobile industry in any capacity, use, more or less, all three of these elements. If each will but remember that they must not waste any of these precious things, many thousands of units of each will be able to be diverted to people of the allied countries, whose need is very great. This is a land of plenty and generous abundance. The call is not interpreted to mean that persons shall go without food, fuel or power. But if each cuts their allowance to an extent that they feel it, know they are doing it and are able to make an appreciable accounting of it, they will be "doing a bit," and it will mean more of the sinews of war supplied to the brave fellows who go "over the top" in Trenchland for the glory of the Stars and Stripes and the salvation of mankind. Have a wheatless dinner and a meatless day. Don't waste gasoline. Get more done in a normal mileage than ever before.

In THE Idea Exchange of this issue there is announcement of an added reward for the best topical letters. The subjects bear on practical information that one motorist will tell another every time they have the opportunity.

Do You Want Foreign Business?

THE motor vehicle market of the world is open to all advertisers in the Automobile Journal. Makers of pleasure cars, trucks, parts, fittings, supplies, accessories, electrical equipment, tools and machinery have equal opportunity to benefit.

8000 Foreign Trade Buyers

- In -

85 Foreign Countries

The simple, practical, sure and economical channels through which to reach all jobbers and large dealers in a world wide market is afforded.

The time to start to secure this business is now.

DETAILED INFORMATION AT REQUEST

Automobile Journal Publishing Company

Times Building, Pawtucket, Rhode Island







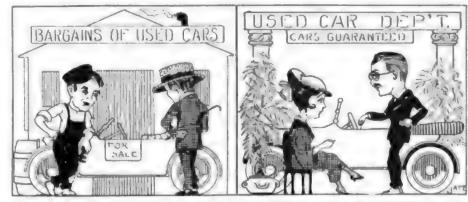
equation and the ridiculousness of it is at once apparent:

> 5,000 miles = \$600.45,000 miles = \$600.

5.000 miles = 45,000 miles.

"I wouldn't attempt to refute your argument in favor of values," said the customer, "but I have heard that repairs ran up pretty fast on used cars and frequent replacements were necessary. Is that not a fact?"

"Well," said the dealer, "that is jumping to a conclusion not based on experience. It is much like accepting as a fact mere rumor like saying that Jones is a chicken thief when you never had any chickens or heard of anybody having any chickens that Jones could steal, or saw Jones carrying around any chickens. As a matter of fact such rumors or hearsays are usually based on the stigma that has been given the name of 'used car' to prejudice its value. What grounds have you to believe that because a car has been sold once that it would require or need any more replacements than one that has been in service for the same length of time with the original owner.



Modern Salesroom for Used Cars is More Effective Than the Blighting Surroundings of an Old Shed.

formed on the subject of used cars, or else had allowed someone to create a false impression in his mind regarding them when the dealer, scenting the customary finale on the part of the average prospect, said: "Your attitude in the matter is not mysterious to me in the least. I have had hundreds of customers come in here in a doubtful mood,

feeling as though they were bargaining for a pig in a bag. There is no mystery about a used car just because it is on its second sale. Many people think so, however, because they are inexperienced. Hence the only way they ever become convinced is to purdoubts vanish rapidly wonder how them. You probably

chase one, and, after a short while, their 80 that they they ever came to harbor are not aware that there are nearly as many users of socalled used cars in

the country as there are new car owners, and the majority are thoroughly satisfled owners.

"We don't sell any cars from this store that have any mechanical imperfections or broken parts that would cause a motorist inconvenience and trouble that he had no reason to expect," said the dealer, "and that is why we market several thousand used cars annually."

"Is that car there all oiled up and ready to start out?" asked the customer "If it is I will take it."

As he pocketed the check the dealer chuckled to himself that pushing the sales of used cars wasn't so bad after al!, as it had no demonstrations, trades o other features to mar it.

MECHANICAL AND EFFICIENCY EXPERT INDORSES APPERSON.

The Apperson Brothers Automobile Co., Kokomo, Ind., have reason to be exceptionally proud of a letter received

from Charles E. Torrance, the well known engineer, owing to the high praise in which he refers to their product. Coming from a mechanical and efficiency expert of the prominence that Mr. Torrance enjoys, his comment on the Apperson car is of particular significance.

Following is an extract from his letter: "I am at present driving and own one of your standard seven-passenger, sixcylinder. 1917 model touring cars, and can conscientiously say that it is the finest and most satisfactory car I have ever driven. It has a wonderful reserve of power and I have yet to find a New England hill that I cannot take on high gear and accelerate on without the slightest difficulty. I am getting 900 miles to a gallon of oil, using Mobile Arctic, and my gasoline mileage is proportionately excellent.

PIERCE-ARROW EARNINGS \$2,317,562 FOR SIX MONTHS.

The Pierce-Arrow Motor Car Co. for the six months ending June 30, 1917, reports net earnings of \$2,317,562, or \$6.66 a share on the common stock.

What Recognition of Real Used Car Values Will Do

The Automobile Journal asserts that closer attention to car conser-vation and the recognition of service value as the only reliable basis for used our prices will go far-

To dissipate the Used Car Problem. To establish confidence in the consumers that they are getting gen-nine value for every dollar expended,

To elevate the plane upon which are are exchanged and the used car

business in general is transacted.

To benefit manufacturer, owner and dealer by restoring real busi-

To make possible the selling of a used car with a definite guarantee.
To eniarge enormously the market for cars and create a much larger body of motorists.

To stimulate the demand for parts,

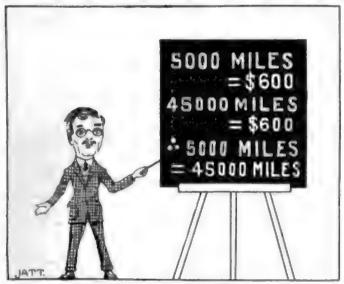
replacement and accessories of all

To transform dissatisfied patrons into enthusinstic motorists all the

To educate the public to the true qualities of motor cars, their intrin-sic initial worth, large mileage caps... bilities and endurance.

And, with the utmost frankne place the used solid foundation,

DODIC-



Set Price Car Depreciations Fall When They Try to Make One Equal Nine.

None at all except the prejudice inspired by the sound of that name 'used car.'

"I have just shown you a number of instances that such is not the case. One man only spent \$18 in five years on his car and there is no reason to believe that the car would have required any more expenditure upon it had it been owned by five different persons in that time than in remaining in its original owner's hands."

What Difference Who Owns the Car?

The dealer then produced another letter from a man who had driven his car 50,000 miles and his upkeep was only \$150. In displaying the letter, he said: "Is there, then, any reason for believing that if that man, instead of running his car five years, had sold it at the end of the first year, the new owner would have had to spend \$300 or \$400 on upkeep?"

Making the Sale.

The customer was on the point of admitting that he must have been misin-

ADVERTISED CARS SHOW BIG PRICE VARIATIONS

Set Price Idea on Used Automobiles Becomes Ridiculous in the Face of Values as Shown Constantly in Columns of the Daily Press

tised sufficiently wide discrepancies are

found to show that a variation in price

Ludicrousness of the set price idea for used cars becomes extremely apparent when taken up in connection with the advertisements of second hand cars appearing daily in the press of all large One needs only to examine carefully these advertisements as reprinted in the Automobile Journal to discern the impossibility of a proposition to fix a price on the property of some one else. In the case of almost every car adver-

of from 10 to 100 per cent. exists, representing the difference of opinion among owners and their judgment as to what the car should bring if placed on the market.

These prices could not be said to represent a nominal value only, as while all the cars are not always sold at the figure asked, a good majority must be, or else such a uniformity in the asking price could not continue to be shown from week to week. They do represent, however, the real market value of used cars, as while possibly in some instances a buyer could secure a reduction below the price asked, it is generally a rule that offerings are made at a minimum in order to facilitate the sale, a fact which is particularly true with those advertisements inserted by the used car dealers.

An American 6-cylinder 6-48 underslung (late model) touring car: fully equipped; shoes all new; many extras; cost \$4500; sacrifice if sold at once: \$425.

1916 ABBOTT-DETROIT.
Eight-cylinder, 7-passenger; only run
7900 miles; perfect throughout; repainted;
cost new \$2000; mark down price, \$600.

1917 APPERSON CHUMMY, \$050.

Just like new; only run few hundred miles by present owner, who has pur-chased touring car; must be seen to be appreciated.

1016 APPERSON, \$850.

Eight-cylinder Chummy rear is in excellent condition. roadster: this

1916 BRISCOE TOURING CAR.

New paint, good tires; just the car for salesmen; was \$475; now \$390.

1016 BRISCOE \$325.

Small five-passenger, electric starter and lights, wire wheels, recently painted; looks and runs good as new car; nice tires; fully equipped; a very cheap car to run; lots of power; must be seen to be appreciated.

BUICK for sale: 1917, Little Six, touring: excellent condition; good tires; two spares; price \$800.

1917 BUICK TOURING \$775.

Light Six roadster, in excellent condi-tion and fully equipped; all good shoes and original paint excellent; light and inex-pensive to operate and very easy riding; easy riding; call for bargain.

1016 BUICK ROADSTER \$850.

Model C 55; original paint and tires perfect and mechanically perfect throughout; seats 3 and is a powerful, easy rid-ing, quiet running roadster.

1916 LIGHT SIX BUICK ROADSTER \$800.

This car has had careful handling; paint, varnish and upholstery look like new; good tires and one extra with tire cover mounted on rear; small mileage; this is an exceptional trade in one of these snappy roadster models. "Money Back Guaran-

1916 CADILLAC "R" SEVEN-PASSENGER

TOURING \$1250.

Tires, paint, finish and upholstery of this car are in excellent condition: a very proposition at this figure. "Money Back Guarantee."

1916 CADILLAC TOURING \$1100.

Cannot be told from a new car; owner must dispose of this high grade car this work and will sacrifice for quick sale: call at unce.

#600-1916 CHALMERS 36.

Six-cylinder touring car; in good condi-tion and fully equipped.

\$1000 1916 COLES.

Eight-cylinder; complete equipment, cluding two spare rims, humper, etc. equipment, in-

-1916 DAVIS SIX TOURING.

Seven-passenger, in the finest possible condition; has a Continental motor and cost \$1550 new.

FOR SALE-1916 four-passenger Davis roadster; run only 5000 miles; car guaranteed perfect; price \$690.

1916 DAVIS; 6-passenger; run miles; looks and runs like new; \$750.

1917 DODGE TOURING \$650.

Only run few hundred miles by young lady who must dispose of it owing to ill health; finest possible condition throughout and has every extra; guaranteed.

1917 DODGE TOURING \$425.

DODGE BROTHERS TOURING \$575. 1916 production; four new tires and re-finished body give appearance of new car.

1916 DODGE TOURING \$525.

DODGE ROADSTER, 1916, \$625

Run less than 9000 miles; fine condition; summer and winter tops.

DODGE BROS. ROADSTER \$550. 1916 production; has low mileage; been well taken care of.

Touring car: used 600 miles: with self-starter, electric lights, demountable rims, same size tires all round, shock absorber, Yale switch, tire holder, every possible Yale switch, tire holder, every pertra; cost new \$525; just like new

1917 FORD \$360.

Touring car, almost new, extra equip-ent: Hassler shock absorbers, speedometer; fully guaranteed.

1917 PORD TOURING \$325.

Two to choose from demountable rims, 23 tires, electric lights, extra shoes 30x3 1/2 and tubes; fine mechanical condition.

1917 FORD \$365.

Roadster; like new; equipped with many extras; demountable rims, extra tire rim, speedometer; shock absorbers, new car guarantee goes with it.

1916 FORD \$310.

Touring car; equipped with many extras; 1917 style hood and radiator; Grav & Davis self-starter, electric lights all round; two extras, shock absorber the carrier; cost new \$685; rare barguin

1016 PRANKLIN TOURING \$1400. being refin-Rebuilt, guaranteed, now

inhed.

1916 FORD for sale; in first class condition, price \$225.

1916 HAVNES LIGHT SIX TOURING \$650. New tires good condition.

HAYNES LIGHT SIX, 1918.

Just overhauled; runs fine; all good tires, price \$800.

1917 HUDSON SUPER SIX CABRIOLET \$1500.

This ideal three-passenger convertible roadster has the full panel glass sides, easily converted into an open coupe effect or roadster, an abundance of room; leather lined, exceedingly smart and trappy in appearance and the only car of its kind offered today; this means quite an approximately support the state of th appreciable saving; come in and look it

1917 HUDSON CABRIOLET \$1325.
Looks just like new; has been run 3659
miles; if you are interested in a car of
this type come and ride in it.

HIIDSON Super-Six 1916 touring \$900.

1916 HUDSON TOURING CAR.

Seven-passenger; paint and general ap-pearance excellent; amail tires; will give good gasoline mileage; a cheap car to

HUPMOBILE, 1917; 5-passenger; 1500 miles; bought new July 14; \$1250.

1917 HUPMOBILE Touring in fine condition; \$850.

\$750-LATE 1916 HUPMOBILE TOURING

In good condition and fully equipped; looks like new

1916 INTER-STATE, used only by lady a few months; 26 miles to gallon of gasoline; price \$550.

1915 JEFFERY TOURING \$450.

This fine, light family touring car is fully equipped and has had very little mileage: inexpensive to operate: easy riding and quiet running.

1915 KING TOURING CAR. Five-passenger, like new; a big bargain at \$590.

1917 KISSEL KAR ROADSTER \$716.
Has been run 2600 miles and looks just like new; if you want economy be sure and see this; also a very comfortable roadster.

1915 KISSEL 8660.

A four-cylinder, seven-passeuger, 40-horsepower, economical touring car; splendid appearance; all good tires; completely equipped with tools, pump, jack, etc. "Money Back Gunrantee." 804 4 11 Juli

-131 Ma

1917 LEXINGTON: guaranteed: \$1156.

1017 MAXWELL \$600.

Five-passenger touring car; used 50 lles; full equipment; cost new with extras \$725; new car guarantee goes with this car; fine chance to get a new car at less than cost.

1917 MAXWELL TOURING \$465.
Only run 700 miles by present owner, who must sacrifice for quick sale; fully guaranteed and cannot be told from a brand new car; call at once.

1917 MAXWELL ROADSTER \$440.

Appearance and tires like new; driven but 3000 miles; the recent announcement of a price increase, which has almost taken effect, should make this a most attractive offer.

1917 MAXWELL CABRIOLET.

Has been carefully used and is in excel-lent shape; a perfect doctor's car; price 1625.

1016 MAXWELL TOURING \$400. 4-cylinder, finish like new; low milenge: excellent mechanical condition; motor run just enough to limber it up; electric lights and starter.

1916 MAXWELL \$875.

Touring car with self-starter, electric lights; in the finest possible condition; tires and paint new; demountable rims; one extra; shock absorbers, call for dem-

1916 MAXWELL RUNABOUT \$368.

Almost new; sent in by present owner, who must dispose of it before next Thursday; a fine chance to get an excellent light runabout cheap

1917 METZ TOURING \$885.
Cannot be told from a brand new car;
paint, shoes, etc. perfect and motor quiet
running and powerful; don't miss this one.

1916 METZ TOURING \$350.

Electric lights and starter; had very low mileage; used entirely by private family; very economical to run; upholstery and tires in Al condition.

1916 METE TOURING \$325.

Electric lights, starter, demountable rime, carefully driven; owner has bought new Dodge Brothers touring car and is willing to sell at above low price.

1916 MITCHELL 6, 7-passenger; with 4 almost new tires; \$600.

1015 MITCHELL \$235.

Five-passenger; has electric starter and lights; 4 good tires; six-cylinder; cost over \$2000.

\$826-1917 MUNROE TOURING CAR.
With wire wheels: extra wheel and tire;
car has had very little mileage and is absolutely like new.

1917 NATIONAL CHUMMY ROADSTER \$1100.

Beautifuly finished in dark green with natural wood wheels; equipped with seat covers, clock, etc.; practically all brand new tires and two extra with tire covers mounted on rear. Contrary to the general rule this car comfortably seats four pas-sengers and is an extremely snappy, powerful and high grade car; full tool equipment. "Money Back Guarantee."

1917 OVERLAND \$418.

Model 75, light 5-passenger touring car; driven very carefully but 2500 miles by a lady, all new tires and in extra fine condition; full electric equipment.

1917 OVERLAND \$390.

Roadster; model 75 B; used about 1800 miles; equipped with self-starter, electric lights; very light and inexpensive to operate; fully equipped; spare tire and rim; full guarantee goes with this auto.

1916 OVERLAND, 6-cylinder; model 86; touring: \$550.

\$550--1917 OVERLAND TOURING.

This car is an exceptional bargain at this price.

\$400—1017 OVERLAND.

Small model touring car, like new; has its original paint and tires.

1916 OVERLAND, MODEL 86, \$575.

Seven-passenger touring; in Al mechan-ical condition.

1916 OVERLAND \$400.

Five-passenger touring car, model 83B: block motor; has been thoroughly renewed: self-starter, electric lights; must be seen to be appreciated; spare tire and rim.

ROADSTER 1916. \$485; Overland; model 83; best of con-dition; good paint and tires; owner will demonstrate

1016 OVERLAND RUNABOUT \$375. Several to select from; all in finest condition and all fully equipped; model 83, and all have fine shoes and good paint; call for choice.

1917 OLDSMOBILE "M"

Seven-passenger, model 45, run less than 3000 miles; cannot be told from new, very easy riding and flexible; call early and state your own price and terms.

\$875—1917 OLDS 8 ROADSTER. Seat 2 or 4; only used 4000 miles.

1916 OLDSMOBILE 4-CYL, TOURING \$600. Very latest; almost brand new; full guarantee and thorough demonstration allowed: don't miss it.

1916 OLDSMOBILE "4" TOURING CAR.
A car that has had the best of care by female owner; was \$850; price now \$690; \$350 cash; balance easy.

1916 OLDSMOBILE \$700.

Two new tires; best of condition; cash or terms; or take Ford in trade.

PACKARD 1917 twin 6, 7-passenger touring, disappearing seats; guaranteed like new; cost \$3860; bargain for \$2500.

PAIGE "6-46," 5 or 7-passenger touring: overhauled; repainted; new tires; Continental motor; Gray & Davis starting and lighting system; \$900.

1916 PAIGE "6-46;" early series; 5 or 7-passenger touring; overhauled and repainted and guaranteed; \$700.

1916 PAIGE "6-46" roadster: in perfect mechanical condition; practically new tires; will seat three people comfortably; \$700.

1916 PAIGE "6-46" nedan; overhauled and repainted: finished in light gray whip-cord; will seat 7 people comfortably; cost originally \$2300; price now \$1250.

1015 PAIGE 7-PAS, TOURING CAR \$650.

This is the Fairfield model; in excellent condition throughout; paint, varnish and upholstery show the careful handling this car has had; full tool equipment. "Money Back Gusrantee."

1917 PERBLESS TOURING \$1850.

INIT PEERLESS TOURING 51656.
Cost \$2150 and positively cannot be told from a brand new car; only run 1500 miles by present owner, who must sacrifice for quick - sale; fully guaranteed and quick - sale; fully guaranteed thoroughly demonstrated.

1916 PULLMAN CHUMMY \$500.
This fine, light, popular 3 or 4-passenger roadster is in finest condition throughout, light and powerful and easy riding; call for bargain,

1916 PULLMAN \$335.

Small 5-passenger; recently overhauled and painted; new starting battery; has nice tires, demountable rims, fully equipped, lots of power, runs very quiet; 25 miles on gallon of gasoline; a very desirable car; rides very easy.

1017 PEERLESS.

Five-passenger: cost \$2150; run about 2200 miles; perfect mechanical condition.

1917 REGAL Roadster; \$550.

1915 REO ROADSTER \$550.

This light three-passenger runabout is finest possible condition; quiet running and powerful; inexpensive to operate and easy riding.

1916 REO Touring; \$450.

1816 SAXON SIX TOURING.

Like new; thoroughly overhauled; a snap at \$550.

1916 SAXON ROADSTER 8525.

In beautiful condition; tires and paint ke new; just the car for a man that like new: just th wants a light six.

1800-1917 SCRIPPS-BOOTH, 8-cylinder chummy roadster; has had the very best

8775-1917 SCRIPPS-BOOTH. Eight-cylinder chummy roadster, in the finest possible condition; tires and paint like new,

1916 SCRIPPS-HOOTH \$500.

Roadster: used 1000 miles and absolutely like new; fully equipped: self-starter, electric lights, one spare tire and tube; call for demonstration.

SCRIPPS-BOOTH runabout; 1915; worth investigating; price \$425; is in fine condi-

1917 STEARNS-KNIGHT, S-CYLINDER, 7-PASSENGER TOURING \$1390.

This car has had such small mileagethat it would be hard indeed to tell it from a new car; has no mars nor scratches and is an opportunity for the person desiring such a car to save several hundred dollars. "Money back guarantee."

1917 STEARNS 4-CYL. TOURING.
This fine, light family touring car is inexpensive to operate, easy riding and quiet running; plenty of power and looks like a brand new car. Call for bargain.

1917 STEARNS ROADSTER.

Eight-cylinder, looks and runs like a brand new car and is powerful, speedy and very quiet running; fully guaranteed and thoroughly demonstrated.

\$650-STEARNS-KNIGHT.

1915 limousine: in exceptionally fine me-chanical condition and has had very small mileage.

\$750-STUDEBAKER,

1917 touring; completely equipped; has one extra tire and tube.

1917 STUDEBAKER TOURING \$650.

Six-cylinder, almost new and is a fine tight 7-passenger touring car; suitable forfamily or renting purposes; very powerful and easy riding; call at once.

1917 STUDEBAKER, MODEL 35, \$550. Seven-passenger; original paint; four good tires.

1916 VELIE,
Newly painted, 7-passenger car powerful, easy riding, economical to run, fine shoes, price \$675 or exchange for smaller

1916 VELIE 5-PAS. TOURING CAR. Like new: be sure and see this one; you can huy it now for \$620.

\$575-1916 WILLYS SILENT KNIGHT

OVERLAND ROADSTER.

Has had very little mileage and is absolutely like new; has its original paint, slip covers on seats and is fully equipped.

1915 WINTON SIX.

Seven-passenger, 48-horsepower; gen-eral appearance excellent; shoes very good, motor quiet, very low mileage; terms with responsible party.







Study of Automobile Engine Cooling System

Including Comprehensive Investigation of the Radiator, the Water Jacket, and the Circulation. With the Fan Tests Submitted to the S.A.E. Suggesting the Selection of a Standard Method of Conducting Such Tests

By A. K. Schanze*

(Chief Engineer Pitter Fan Co.)

N TAKING up the subject of cooling internal combustion engines on automobiles, the author intended to devote narticular time and attention to the fan. However, the performance of the other factors in the cooling system, namely, the radiator, the water jacket and the circulation, is so closely linked with that of the fan that a discussion of the subject would be incomplete did it not take them into con-

This paper will deal with water cooled engines only; air cooled systems will not be discussed.

The cooling system of the internal combustion engine as now applied on a majority of passenger cars normally divides itself into four main units: The water jacket around the engine cylinders, the circulating system, the radiator and the

The order in which these have been named seems to be the order of their importance in the minds of most engineers, consciously or otherwise. It seems also that this is the historical order in which real scientific research and practical development have taken place on the cooling systems now in use.

The author is of the opinion that no order of relative importance can be assigned to these four divisions of the cooling system. They form a chain whose strength is only that of the weakest link, and wherever one of the four falls below its proper standard there lies in the system an imperfection that should be remedied.

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Cooling systems give outward evidence of Imperfections in two general ways; they overcool or they dercool. Of the two latter is far the more com-

The function of the water jacket is to carry such volume of water that it will take from the cylinder walls only that heat that cannot be converted directly into mechanical energy, and the accumulation of which would be destructive to the cylinder material. From such a definition it would appear that, given the number of heat units generated, the mechanical work to be done and the heat units in excess of the latter requirement, a water jacket would be a simple matter to design.

gineers. The author, during fan

has found only three or four apparently ideal water jacket designs. In the main, water jackets leave some room for

a jacket must contain does not give the answer to the cool-

The mere solution of the problem of what volume of water

ing problem. The distribution of the water layers around

the cylinder walls may be of even greater importance than

gine has stopped the temperature recorded by a thermometer placed in the filler cap mounted 20 degrees, from 200 to 220 degrees Fahrenheit. We lost two thermometers through having them blown from an improvised bushing in a hole in the filler cap, a jet of steam shooting 20 feet into the air from a radiator, the water in which a moment before had not been near the boiling point. Thermometers lashed in place indicated temperature of 220 degrees Fahrenheit. Repeated experiments could lead only to the conclusion that the whole mass of water was not being raised through that range of temperature in 40 or 50 seconds, but that some little patch on top of the cylinder was being converted into steam so fast that the filler neck, which was being used as a steam dome,

could not act through the overflow to relieve the pressure.

Whenever a design of water jacket permits such a condition every effort should be made to get rid of it. The condition is dangerous to the mechanical structure of the machine and also to people working around a car. The mechanical danger is present in radiators in which large areas and thin structures are not designed to carry pressures above the atmosphere. Steam above 212 degrees means such pressures. Many a radiator manufacturer has undoubtedly been called upon to replace leaky radiators that were not really

The danger to human beings lies in the possibility of a clogged overflow pipe and an unsuspecting person looking Curve into the filler neck at the psychological moment author saw this happen about

200 defective. 100 PEVOLUTIONS PER MINUTE OF ENGINE Perhaps it is, but its simplicity is a secret in possession of a limited number of engineers. The author during fanting and the single speeds of the support a year ago, when a man had his face severely scalded.

4 PerCent

15

Tests conducted by authorities on internal combustion engines indicate that high compression contributes largely to the efficiency of the gas engine. High compression is always attended by the danger of preignition unless the cooling system can overcome the tendency.

If the cylinder walls are cool the gas entering on the suction stroke does not immediately expand, fill the cylinder, and

tests that he has conducted on cars of many different makes,

the volume. Ignition takes place in the top of the cylinder, which is longest exposed to fire and becomes hottest. Modern engineering practise has placed the deepest layer of cooling water over the top of the cylinder, which is as it should be. However, it seems to be the foundry practise in some cases to interpose stiffening ribs or small columns on top of the cylinder, which act to retard the circulation, with the result that steam pockets seem to be formed. These are evidenced in some engines whose water jacket volumes are adequate, in the sudden increase in temperature that takes place when the engine stops. The author has noticed in several tests that when the en-

^{*}Non-Member.

thus prevent the full calculated quantity entering. It tends to keep its density at a value in accordance with that established by the carburetor, and then the engine gives more nearly its maximum capacity.

In order to prevent the overheating tendency immediately following the shutting down of an engine, it would seem necessary then to give the water in the jacket such volume and distribution as to enable it to absorb the last heat accumulation in the cylinders, independent of the circulating system.

Jacket design, therefore, should be such as to allow liberal distribution of water and freedom of circulation. Since the circulating systems in general use are what may be classed as pressureless systems, the water will only follow the lines of least resistance within the cylinder. Short turns will at least materially resist circulation, and may even prevent it, and thus cause "steam pockets."

The design must be followed up by close inspection of the casting as it comes from the foundry. Too much stress cannot be laid upon this. The outside of a cored casting receives careful inspection to prove its freedom from flaws, but too often the inside is passed as being hopelessly inaccessible to inspection, and is assumed to be satisfactory if the exterior shows that there are no cracks.

Types of Circulating Systems.

Between the pump system and the gravity (thermosyphon) system of circulation there is at present somewhat of a race for supremacy. The pump system frequently overcirculates, or tends to, while the gravity system undercirculates. Both faults are conducive to trouble.

In practically all pump systems the speed of the pump varies with the engine speed. This is logical enough, and conforms with good engineering theory and practise. Rotary pumps must attain a certain minimum speed before they do any effective work. This means that the starting point is considerably above zero, say about 250 or 300 revolutions per Their efficiency increases after they get up to 500 revolutions per minute, usually until the speed is 800 or 900 revolutions per minute; the result is that when the engine speed is such as to result in heating the pump, which was designed to do its circulating at a car speed of 20 miles per hour, is working at high efficiency. In such cases, however, the water is thrown up into the top of the cylinder and the radiator tank faster than the internal friction of the radiator will allow it to return to the pump. The bottom of the radiator is thus one moment empty and the next full, or it may be simply allowing a small part of the water to pass into the pump and a large part to be lost through the overflow pipes. When the radiator is thus, in part, deprived of water, it cannot perform the full amount of cooling action of which it is capable. Overheating, or at least inefficient cooling, results.

It would appear, then, desirable to select a pump speed designed to circulate the water within the limits of the radiator frictional resistance and then always run the pump at that, regardless of engine speed.

In marine work, circulating pumps are used in connection with the steam condensers in exactly the same manner in which they are applied to automobiles, and it has been found that pumps have to be controlled independently of engine speed. Such practise is now universal. The automobile engineer might well investigate the experience of marine engineers along these lines.

Thermosyphon Systems.

The gravity or thermosyphon system of circulation, which is in its infancy as regards practical development, has been used with varying success. At best its impulse is feeble, owing to the lack of head. On this account it succumbs readily to any abnormal frictional resistances that may result from solid matter in the water. It recommends itself because of its simplicity of construction, low initial cost, manifest economy of operation, and the advantages derived from the fact that it continues in operation for some time after the engine stops.

Its practical application to the car so as to realize these advantages is difficult. At present too many of these systems are arranged in almost the same way as the pump system, but with the pump omitted. Best results in gravity circulation, as applied to the heating of dwellings and other

buildings are obtained with the horizontal runs comparatively short as compared with the head pipe. The principle is identical in the automobile. The head pipe must always remain well submerged. This latter feature cannot be accomplished without the use of a reserve storage tank attached to the top of the radiator.

Radiator Requirements.

After the body designer has established the shape of the radiator, and the purchasing agent has fixed its cost limit, the designing engineer can go as far as he chooses. Frontal area should be a maximum, and upon this depends net radiating area.

Radiating area can be considered from a horsepower basis, as the radiating action is exactly the process of doing work. Of the total heat of the engine absorbed by the water we have only to deal with the small residue that would cause overheating if not carried off by the radiator.

A cubic foot of air in passing through a radiator and being raised 50 degrees Fahrenheit in temperature, absorbs one B. t. u. A horsepower represents 42-4 B. t. u. per minute and upon this basis we can arrive at the other results.

The radiator whose heat transferring qualities are such as to give a uniform rise of temperature to all air passing through it, regardless of the velocity of the air, is an ideal not beyond our reach. Some are in existence that so closely approach this condition as to be considered perfect for all practical purposes.

For efficiency not only is it necessary to have the air pasages free from solder obstructions, but it is just as important that they be of a size and shape that will give a good smooth run to the air. The more air that can be passed through a radiator the greater will be its cooling power.

We must also look carefully at the inside of a radiator to determine its capacity and the freedom with which water can circulate. On several occasions tests have shown that capillarity was preventing free circulation. This condition is too well known to radiator designers to need comment, but the fault does occur occasionally, and is probably due more to workmanship than design.

Core depths of as much as four inches are in common use and have their purpose. Since expense is increased with core depth it is well to regard the radiator and fan together; moreover, the power of the fan will make a large difference in the core depth. Just what conclusions to draw on this phase of the subject the author is at a loss to know. It would seem that a four-inch core was too deep for greatest efficiency, and this has at various times proved to be the case. Yet upon some tests conducted on two different makes of radiators the 3%-inch core proved to have greater capacity than the 3%-inch core.

As a practical suggestion to car builders the author offers that every purchaser be furnished a special card cautioning him to keep the exterior of the radiator as clean as he possibly can. Much heating complaint would be avoided if radiators were kept clean. Tests go to prove that when a film of oil gathers enough road dust the radiator efficiency becomes about one-quarter normal.

Selecting the Fan.

Researches made by radiator manufacturers have shown that cooling varies directly with the quantity of air passed through the radiator, other conditions being uniform. It has, therefore, been the long time hope of many of the radiator manufacturers that an improvement be made in fans.

Experiments conducted by the writer (see Figs. 1 to 5) have confirmed the theory that cooling varies directly with the quantity of air drawn through a radiator.

Some engineers place little stress upon the value of air as a cooling agent, except within very wide latitude. They apparently are of the belief that it requires a large increase in air delivery, say 300 or 400 per cent., to make any noticeable improvement in the cooling apparatus as a whole.

In contravention to this argument it need simply be pointed out that a certain time honored practise among some engine builders proves that the contrary is the case. When engines are placed upon the dynamometers to be "run in" they are usually connected with their standard radiators, and carry their regular fans. Experience showed in some cases that this did not provide sufficient cooling to make safe running,

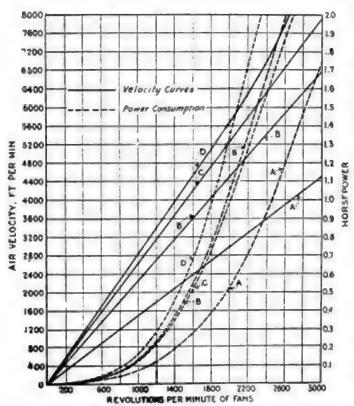


Fig. 2—Velocity and Power Curves for 18-In. Fans. Curve A.—Four-binde Fan (Fiat Bindes). Curve B.—Three-arm Multi-binde, Curve C.—Five-arm Multi-binde (Special). Curve D.—Five-arm Multi-binde (Standard).

so the simple expedient of placing an electric fan on a bench in front of the radiator and directing its air current into the radiator is resorted to with satisfactory results.

First and foremost in the selection of a fan should be considered the element of quantity of air delivery. The ideal radiator, as has been stated, is the one that will give off its heat at such a rate that the air that passes out of it can absorb no further heat units. In combination with this radiator the ideal fan is the one which will draw air through the radiator at such a high velocity that the air undergoes no measurable increase in temperature as it passes through.

The rate of heat transmission from one medium to another is directly proportional to the difference in the temperatures between the two mediums. This rule applies exactly between all the variations met with in automobile practise. Therefore, the efficiency of a radiator and fan system combined would be greatest when the mean temperature of the air passing through the radiator were lowest; or, in other words, when the difference in temperature of the water in the radiator and the air passing through it were greatest.

As an illustration, assume the case of a radiator on a summer day, with atmospheric temperature of 85 degrees, mean water temperature of 200 degrees and a rise in temperature of air passing through the radiator of 50 degrees. The mean air temperature through the radiator is, therefore, 86 + 50/2 = 110 degrees, and the differential between the water and air is 90 degrees. Heat will be transmitted in its proper ratio to this differential.

Take, then, the case when all other conditions are the same as in the foregoing case, but increase the air velocity 40 per cent., and thereby reduce the temperature rise from 50 to 30 degrees. The mean air temperature through radiator then is 85 + 20/2 = 100 degrees, and the differential becomes 100 degrees. Heat will be transmitted at a faster rate in the proportion of 100 to 90, or an increase of 11 per cent.

The foregoing demonstrates that if one fan has twice the capacity of another it does not follow that a 100 per cent. increase in the engine load capacity can be looked for.

As a matter of practise, then, the rule can be set down that the fan is of vital importance, and that the best fan obtainable should be installed. The question that follows is, what is the best fan obtainable? The answer to this is the

fan that on any limit of diameter will give the maximum air velocity per revolution is the best fan.

Air velocity depends upon a fan's ability to build up pressure, and pressure overcomes the normal friction in the radiator and drives the air through at a velocity proportional to the square root of the pressure.

Fans of any one design increase their capacities in approximately geometric progression with the increase in diameter. Best practise would therefore suggest the use of the largest diameter possible on any particular model of car.

Classification of Fans.

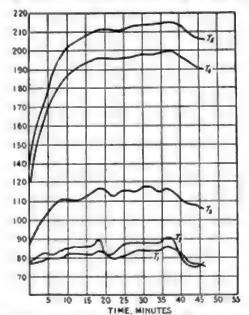
There are several distinct types of fans offered by the various manufacturers, classified for description as follows: Rim fans, which are those whose periphery is bound by a circular rim; flat blade fans, which are usually of three or four flat blades built out from a central spider; curved blade fans, which are similar in construction to the flat blade fans, except that the blades are curved somewhat after the manner of a garden trowel; and multi-blade fans, which are of two or more arms, up to six, and in which each arm consists of two or more blades.

Taking them in the order named we note two types of rim fans, namely, those having a thin rim almost like a wire, and those having a broad rim equal in width to the sweep clearance of the blades. In the former type, as nearly as the author can ascertain, the rim is supposed to add strength in the resistance both to centrifugal force and to bending. It is also intended to act somewhat as a safeguard to the radiator, should the fan become bent or out of line and strike the radiator. In the latter type of rim fans it appears that the intention is to reduce noise.

The author has conducted air delivery tests extensively on both types of rim fans and has found them very inefficient.

Flat blade fans are the most common in use at the present day. They are usually of the four-blade type, built upon a central spider. Their air delivering qualities are not good at low speeds, say at a peripheral speed less than 5000 feet per minute, consequently they have to be run at very high speeds. High speed fans are noisy and consume a large amount of power. These two factors will be discussed later in this paper. It is safe to say that the flat blade fans are very efficient when working at peripheral speeds in excess of 15,000 feet per minute, which for 16 and 18-inch fans is close to 3000 revolutions per minute.

Curved blade fans, as a class, are similar in their construction to flat blade fans; that is to say, they are normally



TIME, MINUTES

Fig. 3—Variations of Air and Water Temperaturea.

T₂—Free Air in Room. T₂—Air Entering Radiator (4 In. from Face). T₃—Air Leaving Radiator (54 In. Away). T₄—Water at Pump. T₅—Water in Top of Radiator.

Fan, Five-arm Multi-blade; Dinmeter, 18 In. Engine Speed, 1010 R. P. M. Fan Speed, 1610 R. P. M. (3.4 Per Cent, Belt Slip). Load on Dynamometer, 12.6 H. P. Velocity of Air Through Fan, 1300 Ft. Per Min. Radiator, Diamond Pattern. Belt, Bullt-up V Type.

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built up on a central spider and are of three or four-blade design, generally. In capacity and efficiency they are much ahead of the flat blade and rim fans for automobile use. Of course they do not show a constantly increasing efficiency at very high speeds, 4000 and 5000 revolutions per minute, but then good engineering practise would counsel against the use of any such fan speeds where it were possible at all to get away from it. These fans are good because their efficient speeds are generally comparatively low, and they handle a considerable volume of air.

Only one multi-blade type of fan is at present in existence. This consists of groups of blades placed one behind the other, and presenting somewhat the appearance of two fans upon a single hub. Experiment has demonstrated that this is far and away the most powerful and efficient type of disk fan yet produced. The capacity is from 50 to 100 per cent. greater than that of other types, and its most efficient speed is from 800 to 1200 revolutions per minute for 16 to 20-inch diameters. It develops a high velocity pressure which drags air through the radiator even under adverse conditions. Its power consumption per cubic foot of air handled is at least 40 per cent, less than that of any other type of automobile fan it has been the author's experience to test. It also has another quality that recommends itself to the automobile engineer, namely, it develops a high suction at its periphery. This quality brings the edges and corners of a radiator into use. The advantages of this feature are self evident.

Another type of fan very little used in the automobile industry, but worthy of notice in a paper of this kind, is the centrifugal fan. This is a fan that takes air through the line of its axis and discharges it in the plane of its perimeter. It develops a high pressure, but is of comparatively low volumetric capacity. On air cooled engines it has been found satisfactory, but its adaptability to water cooled systems remains to be worked out.

The engineer in making his selection of a fan should take into serious consideration the amount of power necessary to handle maximum air velocities through radiator. This phase of the question has been considered by very few engineers. A study of the accompanying power curves will show that an astonishing amount of power can be used by a fan when its speeds are excessive.

Fan Power Consumption and Speed.

Take, for example, the 18-inch fans for which the power, speed and air delivery are plotted. At 1000 revolutions per minute the flat blade fan was delivering a velocity in free air of 1423 feet per minute on a power consumption of 0.077 horsepower.

The multi-blade (five-arm) fan, at 1000 revolutions per minute was delivering air at a velocity of 2580 feet per minute on a power consumption of 0.18 horsepower under the same conditions.

Now compare this with what took place at double the speed (2000 revolutions per minute). The flat blade fan handled air at 2826 feet per minute velocity and consumed 0.524 horsepower, and the multi-blade fan generated a velocity of 6060 feet per minute and consumed 1.4 horsepower.

The increase in power, it will be noted, was almost in direct proportion to the cube of the speeds.

Many engines are so geared that the fans at times are supposed to be making as many as 4500 revolutions per minute and the power consumption theoretically increases to six or eight horsepower. It is the author's contention that such a power expended on driving a fan is completely wrong, and that its practise should be discontinued without delay. Engines running up steep hills or through heavy roads are frequently shifted into low gear in order to let the cylinders do the work possible at high piston speed. Under such circumstances, then, the fan is demanding one-sixth to one-eighth of the engine's power. This six or eight horsepower generates its quota of heat, which again has to be extracted. It is a good fan that will assume this additional burden without allowing boiling.

Fan Belts and Pulleys.

In looking at the situation from a practical standpoint we must investigate the medium through which this high power reaches the fan. This transmission is usually through either a flat or V belt. Can a leather or canvas belt, whose contact width is between three-quarters and 1½ inches, transmit much over three horsepower? The best authorities on the subject say it cannot be done. This answer is probably correct.

Many pulleys in use are too small in diameter. While theoretically pulley diameter has no effect whatever on power delivery, it does have a material effect on belt slip and consequently upon fan speed. Much fan trouble arises from this cause.

The experience of belt makers shows that a pulley should never be of a diameter less than 30 times the thickness of the belt. This is practically out of the question in most automobile designs, as it would necessitate a four-inch pulley. However, the fault of going to the other extreme and using a pulley 1½ to two inches diameter should be corrected, and must be before the automobile manufacturer can feel assured of getting the designed performance from fans. A minimum diameter of three inches is earnestly recommended.

Much remains to be done in selecting belts, and from recent reports it appears that some types of V belts are giving superior service.

Experiments conducted by the author demonstrated that with a one-inch flat belt a 15-inch fan could not be driven at a speed greater than 3200 revolutions per minute without a large percentage (over 30) of slip, which soon proved destructive to the belt.

The summary of the whole situation then, is that when the engine gets beyond a certain speed, so that the fan makes 4000 revolutions per minute or over, the belt begins to slip, and once this condition has set in the fan becomes worse than useless. A slipping belt does itself much harm, and in addition polishes the fan pulley so as to make the percentage of slip at normal speeds greater.

Disadvantages of High Fan Speed.

Several hundred thousand cars are built annually in which fans are so connected as to develop a speed of from 2000 to 2500 revolutions per minute when the car speed is 20 miles per hour. These cars, most of them, do not show a tendency for the engine to heat when traveling over smooth roads at that speed, but they do when making from 30 to 40 miles per hour, or when the engine is doing the same amount of work in one of the low gears. Then at just the time when the cooling agents are most in demand the fan is either slipping, or using an amount of power not at all commensurate with its cooling power.

In fan practise, both in the ventilating and in the automobile trade, it has been pretty well proved that all fans become noisy when their tip speeds exceed 5000 feet per minute. At any speed beyond that there is bound to be noise, which increases with the speed. When 16 and 18-inch fans are running at 2000 revolutions per minute or more they are far above the silent zone speed. It many cases they produce sounds much resembling a saw mill.

When a car is racing at 35 or 45 miles per hour the driver is too busy to notice the objectionable noises, but when the same car rolls down a smooth city boulevard at 20 miles per hour, and all of the other mechanisms are practically noiseless, it is somewhat incongruous to have a little two or three-pound fan making all the fuss.

The demand from engineers who build our standard cars is daily becoming more insistent for less noise from the fan. The only way for this demand to be met is to bring the fan speeds down to somewhere within reasonable limits.

The apparent obstacle to meeting this demand successfully is the fact that, generally speaking, fans in use today will not deliver much air until they are buzzing at tip speeds of about 10,000 feet per minute. It is to be hoped that automobile engineers will make fan builders produce better fans.

Everything points to the necessity of reducing the fan speed; wear on bearings and belts, noiseless operation, and, most of all, conservation of power, demand fans that can deliver the air at lower speeds. In short, we must have better fans.

Types of Fan Bearings.

Bearings are of several distinct designs: the plain iron or steel bearing, similar to an ordinary wagon wheel on its axle; the bronze bushing on the steel spindle; the cup and cone

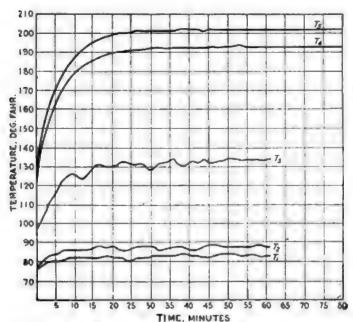


Fig. 4—Variations of Air and Water Temperatures.

T.—Free Air in Room. T.—Air Entering Radiator (4 In. from Face). T.—Air Leaving Radiator (½ In. Away). T.—Water at Pump. T.—Water in Top of Radiator.

Fan, Five-arm Multi-blade (std.). Diameter, 18 In. Engine Speed, 986 B. P. M. Fan Speed, 1591 R. P. M. (8.4 Per Cent. Belt Mile).

Fun, Five-arm Muiti-blade (atd.). Diameter, 18 In. Engine Speed, 986 B. P. M. Fun Speed, 1891 R. P. M. (3.4 Per Cent. Belt Sip). Lond on Dynamometer, 12.5 H. P. Velocity of Air Through Radiator, 897 Ft. Per Min. Belt, Built-up V Type. Radiator, Square Air Tube, 334 In. Core.

ball bearing; the roller bearing and finally the annular bearing.

The iron hub or steel spindle bearing satisfies the demand for a low priced bearing. It gives satisfaction of a certain kind, but it is subject to and does have so many troubles that it really should not be used.

The bronze bushing on the steel spindle is good enough in its way, but it costs real money when properly made, and has a tendency to let its lubricant run out at both ends and spatter things with grease. The saving in cost over one of the types of roller bearings is so little as to make it hardly worth while.

The cup and cone ball bearing has been the most widely used of the so-called "better bearings."

The author has never been able to comprehend just how this type became so popular since its basic principles are wrong for most fan applications. For shafts or spindies that present a uniform vertical thrust the balls take the load in a normal line because their obliquity to the axial line is compensated for by the opposition of one set to the other. Such is the case in motorcycle and bicycle axles. The belt on fans exerts a heavy downward pull, usually from the line half way between the cups and the fan, then exerts a thrust at right angles to the belt pull. The whole arrangement, therefore, seems wrong.

The cup and cone bearings apparently are always looking for trouble. As a matter of fact, a good cup and cone bearing ought to be the most expensive kind to make, but again the element of reduction in first cost has influenced conditions to a point where the greatest criticism that can be made is of the quality of the materials used.

The annular bearing is the ideal for those who are willing to spend the money for quality. Good annular bearings cause no trouble and good ones can be found. They are noiseless and reduce friction to a minimum. They can also take up the thrust without the interposing of thrust washers. The automobile engineer should, however, look out for cheap imitations as there is a wide difference in quality among the many makes of annular bearings. The best that can be had is none too good.

Roller bearings of several types have been offered for fan use. The application of these on fans has been comparatively limited, but there will be a decided increase in their use during the next year. One make in particular has stood the test of continuous running and meets the price qualifications with-

in reasonable limits. It consists of a series of helical steel rollers held in place by two end disk washers. The latter are rigidly held in their planes by small rods that also serve as spacers between the rollers. The whole presents the form of a hollow cylinder two inches long. This is placed over a carefully machined steel spindle. Into the pulley hub is inserted a seamless or split steel sleeve that acts as an outer path for the rollers while the steel spindle is the inner path.

It is earnestly recommended that this subject be considered by the society with a view to standardizing one or two types of bearings. The engineers could then write uniform specifications and fan makers would be free to devote more effort to the fans proper.

Application of Fans.

Taken, then, as a whole unit, the fan should be considered with all the care given any other part of the car. Other parts of the chassis and body should be constructed with a view of letting the fan do its work in the most efficient manner. Assuming now that a fan has been selected the nature of its application must be studied.

The air intake through the radiator should present as little friction as possible; there is a wide difference in this respect. The distance between the fan and the radiator should always be one-half inch.

The air "getaway" will bear much improvement, and such improvement can be made. For best results the discharge area should exceed the intake area by at least 20 per cent. This rule assumes, also, that the discharge space will be in one location and unobstructed. No automobile known to the author presents such a condition. Moreover, in every car thus far measured, the discharge areas are less than the free radiator supply area.

Spaces under the dash are hard to alter, but plenty of louvers can be inserted in the hood, and these should be figured as the primary means of air escape. Why the car designer objects to louvers is not altogether clear, but their necessity is so great that appearance can well be sacrificed.

The air passing through a radiator expands a great deal under the hood. With an inadequate escape area the static pressure builds up to a point beyond the fan capacity and relieves itself by backing out through the radiator.

To overcome this shrouds have been placed around fans in some cars. The effect is then to increase the air distribution over the front of the radiator, but the shrouds are inefficient because of the sharp angle they necessarily make with the rear face of the radiator; furthermore, they cannot increase the capacity of the fan.

The air velocity will be greater than it was through the deep radiator because the friction has been reduced. Thus

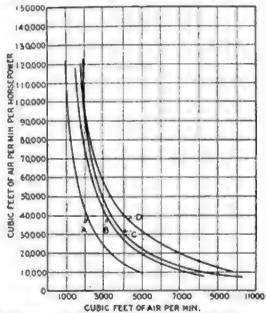


Fig. 5—Relation of Horsepower and Free Air Discharged by 18-1s. Fans.

Curvo A—Four-blade Fan (Flat Bindes). B—Three-arm Multiblade. C—Five-arm Multiblade (standard). D—Five-arm

Multi-blade (Special).

the fan has even more than compensated for the reduction

Methods of Conducting Fan Tests.

Up to the present time automobile engineers have been so busy with the other more complicated phases of their work that few have had the opportunity of familiarizing themselves with the rather whimsical behavior of air and fans. Consequently opinions are so diverse as to what shall be done to test a fan properly that much time is lost and the results obtained are not always satisfactory to either the engineer or the fan manufacturer.

As the S. A. E. has never adopted a standard method of conducting fan tests, the author offers the following methods for consideration:

Test No. 1—Place the fan on the shaft of a sensitive dynamometer equipped with the means of reading speed and power consumption. The fan should be at least a full diameter away from any obstructions in its rear, should have a 10 foot clear from any obstructions in its rear, should have a 10 foot clear discharge space shead, and should have at least a quarter diameter clearance between the table or bench and its peripheral circle. In front of the fan, at a distance of from three to six inches clear of the blades, a light wire frame of small squares should be placed so as to divide the area into any desired number of parts in order to obtain uniform air delivery readings. readings.

The fan should then be run at speeds from 500 to 4500 revolutions per minute, and the air delivery and power consump-

tion recorded for each speed.

Many engineers use the anemometer for measuring air velocity, but experience has shown that this instrument is not reliable for registering the high velocities at the face of a disk fan. It is subject to practically imperceptible, though serious during tests and thus may give rise to erroneous

The pitot tube is by far the most accurate instrument for measuring fluid motion, and is sensitive to low as well as high velocities. Furthermore, it cannot be readily damaged withvelocities. out being immediately observed, consequently the accuracy of its readings can be relied upon.

The results of this test will be a free air calibration of the fan and thus a standard with which tests under other condi-

Test No. 2—Connect the gas engine whose cooling device is to be tested to a high power dynamometer. Attach the fan to the engine in its standard manner and also set up a radiator, properly connected. Put in place the hood, sod pans, etc., so that the entire set up will resemble the forward part of the car.

Place laboratory thermometers in such a way that the fol-

lowing temperatures can be recorded;

Air in room. Air entering radiator. Air leaving radiator. Water in top of radiator. Water entering jacket.

Keep an accurate count of the revolutions made by the fan.

This is very important.

Run the engine under light load, over a range of speeds corresponding to the travel of a car at rates of from 15 miles per hour to 50 or 60 miles per hour. Six or seven such readings will usually suffice. At each speed take a set of readings in front of the radiator for air velocity through the radiator. It will be found an aid to accuracy if the radiator is divided into may 16 squares by chalk marks.

By this method a complete record of air delivery through a radiator is obtained. This test throws the entire burden of air delivery upon the fan, as no assistance is derived from for-

ward motion of the car or from wind.

The pitot tube will be found especially valuable for this kind of test as the detailed behavior of the air can be so clearly

observed.

observed.

Temperature readings can be taken during all these runs, but are not necessary, as they are provided for in the next test.

Test No. 3.—With all apparatus set up as for Test. No. 2, select speed, load and conditions of spark and throttie levers at which heating may be looked for. Impose these conditions and take temperature observations at intervals of about two minutes. Continue this until the water boils or until the water temperature in the top of the radiator remains uniform for 10 or 12 minutes. The fan speed should be constantly checked for silp of helt.

temperature in the top of the radiator remains uniform for 10 or 12 minutes. The fan speed should be constantly checked for slip of belt.

Test No. 4—Road tests may be run finally to check all results against those obtained in the laboratory. It will be found difficult, however, to obtain conditions fit for such tests over public highways generally, owing to the speed laws, other vehicles on the road and the general poor condition of roads over a long stretch. If a good road up a hill can be found, excellent data should be obtainable.

A positive and reliable revolution counter should be placed

A positive and reliable revolution counter should be placed on the fan so that the same checks may be had as in the laboron the fan so that the same checks may be had as in the laboratory tests. This is even more important than indoors, because the car motion over the rough spots will be found to joit the fan bracket loose at times. A thermometer (not a radiator heat indicator) should be secured in the filler cap of the radiator, and one should be lashed to the frame work of the car body to register atmospheric temperature. Temperatures of the other parts of the cooling system cannot be obtained in road tests without resorting to the use of elaborate apparatus such as thermoelectric couples and recording thermometers, and even then the results are likely to be erroneous, because of motion over rough spots.

The spark and throttle quadrants should be marked so that

the levers can be reset to the positions used on a previous run,

if desired.

Measured distances at known speeds should then be run and

A full description of all apparatus used, together with the essential dimensions of the engine, the radiator, the fans, the gear ratios, etc., should accompany the report of every test.

THE DISCUSSION.

Geo. W. Smith, Jr.—Why are multi-blade fans more efficient?

A. K. Schanze—As a fan blade travels through the air it creates a slight wave ahead of it. The leading blade on the multi-blade fan handles the air in the same manner that the blade on the single blade fan does. The second blade comes along and picks up a certain amount of the bow wave that is lost by the leading blade and creates a higher compression be-

tween the two blades than would be gotten on the single blade.

Mr. Switzer—Is it not a fact that the efficiency depends on
the distance between the blades?

A. K. Schanze—If the blades are too close together the efficiency is zero and the energy is wasted. They have to be sufficiently far apart to allow the following blade to pick up all the air that it would if it were free. The multi-blade fan cannot work at as high a speed as the single blade fan. A multi-blade fan takes per revolution more power to turn it. Its operating efficiency does not decrease until about 4000 revolutions per minute; beyond that it will fall somewhat in the same manner that a single blade fan will when it gets up to 5000 to 7000 revolutions per minute.

to 6000 to 7000 revolutions per minute.

J. V. Whitbeck—Can the multi-blade fan he run at lower speeds and does it consume less power than the single-blade

fan?

- power used by the multi-blade fan is much less. We make this basic contention; that, for any given number of revolutions or for any speed, the fan will handle at least 50 per cent, more air than any other fan, or that for any volume of air it will do the work with 40 per cent, less power.

 A Member—If the capacity of A. K. Schange-The efficiency of the fan is such that the
- creased, the resistance is such that the exhaust air cannot be disposed of; the higher efficiency fan would show similar results because the resistance is so great.
- A. K. Schenze—If the passage is not there for the exhaust, naturally the force applied at the front of the fan will act opposite. Handling air on a car is a difficult problem. A certain size of propeller has to be a certain diameter; otherwise a churning of the waveg is produced. Propellers can be operated at an efficiency of 98 per cent. If run at from 1200 to 1400 revolutions per minute, but the air must have clear passage. The difficulty is in placing the propeller at the proper distance.

 A Lencick—It wav be possible that the multi-blade fan is
- S. Jencick—It may be possible that the multi-blade fan is too efficient and compresses the air to such an extent inside the hood that the back pressure prevents sufficient air from going through the radiator. The back pressure near the front cylinder, which is the greatest obstruction to the air current, is sufficient to prevent the radiator cores furnishing air. Of course, if the air does not pass through the radiator it cannot cool the water. The single-blade type of fan will handle only an amount of air that will pass readily beside the engine and over it and under the floorboards, whereas the multi-blade fan may be so efficient that it compresses the air to a degree that destroys its own efficiency. destroys its own efficiency.
- A. K. Schange—The proper thing then is to reduce the speed of the multi-blade fun on the car so that it will do the same work that was done by the other fan at a greatly reduced power consumption.

MOTORCYCLES IN HAWAII.

Registration records of the island of Cahu, Hawaiian islands, on which the city of Honolulu is situated, show that 500 motorcycles are in commission there. With the exception of a few scattering machines all are of American make-Truffic regulations are similar to those of the Pacific mainland cities, with outlying districts patroled by motorcycle policemen.

LORD NORTHCLIFFE AS A WHEELMAN.

The current issue of Blcycle News calls attention to the fact that Lord Northcliffe, the famous English journalist, now in the United States, as head of the British war mission, started in the journalistic world as editor of a bicycle trade paper back in the eightles, when he was just plain Alfred Harmsworth. He was chosen for his first editorial job at the princely salary of \$12.50 per week. An old print just resurrected shows Lord Northcliffe the proud possessor of an old time, solid rubber tired, high wheeler.



Mileage Costs.

To determine fair mileage costs search was made for actual performance records of enough cars and trucks of all classes to make it fair to take them for the purposes of the study. Several sources of information were examined and it was finally discovered that one large company had operated about 350 cars and trucks during 1916 and had kept very careful records of all the costs incidental to their operation. These records seemed suitable for use and were accordingly They were found to cover the operation of a large number of cars of each class adopted except class "D" of the passenger cars. It seemed clear, however, that it would not be equitable to combine this class either with class "C" or class "E" since there is a substantial difference in costs between classes "D" and either of the other two. Hence it was decided to assume a total mileage cost for class "D" part way between classes "C" and "E," believing that in this way substantial accuracy would be gained. The records used gave the total number of miles that all the cars and trucks of each class were run during 1916, together with the total costs of each factor of mileage expense. To determine, then, the average cost per mile of each factor, it was necessary only to divide the total cost by the total number of miles, add together the results and the total cost per mile for each class of cars and trucks was produced.

Hourly Rates.

The determination of hourly rates was somewhat more difficult because of the necessity of using assumptions in computing costs. In the first place it was necessary to assume the number of hours in a year that should be used for finding the hourly rate of expenditure with which an owner might be charged for those fixed costs which are not dependent upon any operation of cars and trucks. It seemed that the equitable number of hours to use was the number of hours that a car was actually in use during the year. Many factors of use were considered and it was finally determined that a thousand hours a year was a fair average of all passenger cars and two thousand a year of all trucks. This was checked in many ways and seems as equitable an assumption as could be made.

Having agreed upon these two assumptions it was necessary to determine what the total yearly cost was for each class of cars and trucks for the items of interest, depreciation, insurance, taxes, license, registration, storage and driver. In order to figure interest and depreciation it was first necessary to determine the average car and truck value of each class. To determine that complete lists of all makes of cars and trucks were taken and the average selling price of each class was ascertained. These were as follows:

			A												
Class															
Class															
Class															
Class															
Class	"E".	4			-		٠	٠							410

Tourists in Canada

THE following statement has been issued by the superintendent of immigration of the Dominion of Canada relative to the regulations of the Canadian government toward tourist traffic:

"Bona fide tourists, being American citizens or citizens or subjects of allied or neutral countries, do not require passports to enter or permits to leave Canada, and are assured of courteous treatment and a hearty welcome. Citizens or subjects of countries with which Canada is at war may not enter even as tourists. Persons born in an enemy country claiming to be naturalized in the United States, or in some other allied or neutral country, should carry their naturalization papers. Persons of evident enemy origin, who claim to have been born in the United States, or in some other allied or neutral country, should carry a birth certificate or some other evidence of their birthplace. To facilitate departure from Canada, males between 18 and 45, entering Canada for a temporary purpose, may secure on application to the Canadian immigration officer where they enter, a card showing that they are not residents of Canada. Women and children do not require any identification card."

TRUCKS.

Class																					
Class	"G"	4	w				0	e											+	+	1448
Class																					
Class	I		w			6				. 4	4	0	æ		×		,			4	3830

Interest and depreciation on these valuations were figured at 25 per cent. This figure may be debatable, but the actual experience of the company whose figures were used showed that an average life of between four and five years was about normal. Therefore, the depreciation figure was fixed at 20 per cent. and five per cent. added for interest.

The average rate of pay for drivers was assumed to be \$1000 per annum and the hourly cost was ascertained by assuming that eight hours a day was fair. This again may be debatable, but when everything is taken into consideration, namely, that truck drivers work on regular schedule, sometimes eight and sometimes nine hours a day, that passenger car chauffeurs work irregularly and that the large majority of cars enrolled have no paid drivers, it seemed fair to figure on the basis of eight hours a day.

Taxes were determined by assuming an average rate of \$20 per thousand.

Insurance was determined from average rates ascertained from insurance companies. It is probable that the insurance costs assumed were somewhat low, but considering that owners vary widely in the classes of insurance taken, it is probable that the assumed costs which were based largely on liability insurance are fairly compensatory to owners.

The items of license and registration and storage were ascertained from the actual performance records of the company.

The actual figures obtained for mileage costs for passenger cars were as follows:

MILEAGE COSTS FOR PASSENGER CARS.

		CIRBS			
	"A"	"B"	C.,	"D"	E
Gasoline and					
lubricants	\$.027	\$.029	\$.028		\$.019
Tire expenses.					.010
Current repairs	.042	.026	.028		.017
Washing	010	.007	.008		.003
Total	. \$.113	\$.090	\$.088	\$.070	\$.049

MILBAGE COSTS FOR TRUCKS.

				Class		
			"F"	"G"	"H"	"I"
Gasoline	and	lubri				
cants			. \$.020	\$.042	\$.052	\$.084
Tire exp						
Current	repair		022	.049	.071	.120
Washing			003	.004	.007	.013
						_
Total.			.\$.057	\$.116	\$.142	\$.247

The complete hourly costs as finally determined as follows:

HOURLY COST	S FO	R PA	SSEN	BER C	ARS.
	Class	Class	Class	Class	Class
	"A"	"B"	"C"	"D'	"E"
Interest and					
depreciation	\$1.00	\$.62	\$.36	\$.20	1.10
Insurance and					
taxou	16	.11	.08	.04	.04
License and					
registration	.02	.02	.02	.01	.01
Storage	18	.12	.09	.09	.06
Driver	.34	.34	.84	.34	.34
Total	\$1.70	\$1.21	\$,89	\$.70	\$.55

HOURLY COSTS FOR TRUCKS.

Class Class Class Class

	· F ·	"G"	"H"	
Interest and deprecia	k-			-
tion	\$.11	\$.18	\$.29	\$.47
Insurance and taxe	m06	.07	.09	.12
License and registr	a-			
tion	01	.02	.02	.02
Storage	06	.09	.12	.18
Driver	34	.84	.34	.34
Total	\$.58	\$.70	\$.86	\$1.13

RAILROAD CROSSING SIGNALS.

A good suggestion comes from a Massachusetts journal to the effect that "Look Out for the Engine" signs at railroad crossings should be placed nearer to the ground so that headlights of automobiles will pick them up quickly and the poles should be some distance, perhaps 150 feet, from the crossing.

In the days when the only vehicles were horse drawn the protection of railroad grade crossings by signs and a bell on the railroad right of way was reasonably satisfactory. These safeguards, however, are ineffectual as regards automobiles.

The driver of an automobile going at a moderate speed of 20 miles an hour ought to have warning of a railroad crossing a reasonable distance away, and he does not get that now unless the sign maintained on its tracks by the railroad is supplemented by others set up by the highway commissions.



places on account of heavy storms and it is still an undesirable touring ground.

HUDSON RIVER VALLEY—The Albany Post Road is in fairly good shape with the exception of the old detour around Irvington and repair work south of Hudson, where one side of the road is open for travel.

THE BRONX—The Eastern Boulevard is closed for sewer construction between Layton and Middletown roads.

Hunt's Point Road is under construction, but travel is pretty fair along one side of the thoroughfare.

The Fort Schuyler Road is under construction between Westchester Square and the Eastern Boulevard.

WHITE PLAINS DISTRICT—Broadway from White Plains towards Valhalla is in fair shape, as is the continuation northwest to the town of Hawthorne and the connection with the Saw Mill River Road.

Winchester avenue is in good shape to Portchester.

The Post Road through Scarsdale is closed for repairs.

The White Plains Mamaroneck Road is in good shape, but West street, which parallels it into Portchester, is rough.

Harrison avenue out of White Plains is in good shape.

The Saw Mill River Road is closed from Elmsford to Briarcliff.

BROOKLYN—Few changes have taken place in the condition of roads around Brooklyn.

Avenue J is closed for repairs between Bedford and Ocean avenues.

QUEENS—Queens Road is open between the Jamaica-Flushing road and Parson's avenue, Flushing.

ROSLYN—The North Hempstead Turnpike is under repair from the watering trough in Roslyn to Bull's Head. Use the left hand road going out of Roslyn at the trough and run down to a small pond, bear right and back into the North Hempstead Turnpike.

RIVERHEAD, L. I—The road to Mannerville is rough and in poor shape gen-

NEW YORK STATE—Orange and Sullivan counties: The trunk line through Goshen and Middletown to Liberty is improving gradually. The old detour west of Bloomsburg is abolished, except for a short distance.

It is still bad going around Mt. Prosper into Monticello.

West of Monticello there is a long detour, but not a bad one in dry weather, around the east side of White Lake and the town of Bethel.

NEW JERSEY—Center street, Orange, is under construction.

NEW ENGLAND—Lower New England has been fairly good until very recently, but the usual midsummer ripping up mania is in vogue during August, and the traveler will meet many detours, most of which can be avoided by carefully planning one's tour and sometimes going a few miles out of the direct way.

The Summer street connection from Stamford on the Boston Post Road north to Bedford is open.

There is still a short detour at Woon-socket, R. I.

The Derby avenue route between Derby and New Haven is closed.

North of Waterbury work is in progress, but detours are not necessary.

The main line from Worcester to Boston is under repair in several places and should be avoided temporarily if possible.

NAUGATUCK VALLEY—Avoid valley at present if possible, as repair work between Naugatuck and Waterbury necessitates using detours over narrow roads.

CONNECTICUT RIVER VALLEY— Repair work is going on in several places between Hartford and Springfield.

HARTFORD SPRINGFIELD—Due to some unforeseen reason both routes from Hartford, Conn., to Springfield, Mass., are under construction at the same time, necessitating detours either via the west or east side of the Connecticut river. The east side of the Connecticut is under construction beyond Ware House Point, while the west side route is good through Windsor Lodge to Suffield, but beyond the construction work necessitates detours that cross and recross the main road four times before Springfield is reached.

WORCESTER-BOSTON—Much of this main route through Massachusetts is under construction, and as half of the roadway is closed during these operations traffic is held up at many places along the 44 miles between Worcester and Boston.

Police Activities

A POLICE campaign against dazzling headlights is now on in Massachusetts. Prosecution is in order for flagrant violators of this law. The Massachusetts Highway Commission has determined to compel a compliance with its rules. One step has already been taken by the commission in holding up and inspecting lights on cars and arrests have followed in Brookline, Fall River and other municipalities. It will be well to remember what the law is:

"Any light thrown directly ahead or sidewise shall be so arranged that no dazzling rays from it or from any reflector shall be at any time more than 3½ feet above the ground on a level road at a distance of 150 feet or more ahead of said vehicle, and said light shall be sufficient to enable the operator of the motor vehicle to see any person, vehicle or substantial object upon the roadway or side thereof, for 10 feet on each side of the motor vehicle 10 feet ahead of said vehicle."

LYNN, MASS.—Two motorcycle officers are patroling Lynnfield street, running from Lynn to the Camp of the Eighth Regiment. A number of arrests have been made. Arrests are also being

made in the same place for violation of the traffic regulations and especially for non-compliance with the regulation making Washington street from Oxford street to Munroe street a one-way street. There is a large sign at the corner of Oxford and Washington street, which reads, "Do Not Enter Here." Motorists should observe this sign.

HINGHAM, MASS.—It will be well for motorists traveling through this town to keep in line and not attempt to shoot by motor cars ahead of them in procession. A number of arrests have been made for overspeeding and for violations of the traffic rules of this town.

MILTON, MASS.—More care should be exercised by motorists in traveling on Adams street, the main thoroughfare through Milton to Quincy, in not exceeding the speed limit and in blowing their horn at intersecting streets. Traps are being operated in various places along this road and motorists violating the traffic rules have been haled into the Quincy Court.

DEDHAM, MASS.—The eight foot law is being enforced in this town.

REVERE, MASS.—The Metropolitan police are enforcing all motor traffic regulations on the Revere Beach Boulevard and we warn motorists to run at a reasonable rate of speed and to blow their horns at all street corners. Many arrests have been made.

BOSTON, MASS.—There is a speed trap being operated on Massachusetts avenue, near the Edison Light Company. Care should be taken in not leaving oars in front of the State House for a period of more than 20 minutes, as the police are watching to arrest violators of this rule. This same rule also applies to cars left in front of the Boston City Club, Ash burton Place.

PROVIDENCE, R. I.—A number of arrests of violation of traffic rules have been made at Riverside, especially with regard to failure to have lamps properly lighted, approaching too closely a street car and overspeeding.

ALBANY, N. Y.—The police of this city are arresting motorists for violation of the traffic laws and especially with regard to not giving proper signals at intersecting streets.

NEW JERSEY—Speed traps on Pennsylvania roads are proving more and more annoying to New Jersey motorists because of their unfamiliarity with conditions in the Keystone state. Warnings have been sent out against a new series of traps west of Philadelphia on the road to Malvern, Pa. Tourists are particularly urged to avoid falling into the hands of these officials.

Motoring travelers are advised to sound their horns at every horn sign and to reduce speed to within 15 miles an hour between signs which read, "Danger, Run Slow." The 22 miles of Lincoin Highway westward from the Quaker City is reported to be sprinkled with constables who have an eye out for technical violations of the local motor vehicle regulations. The yield from these traps is larger because they have been set on the Lincoin Highway where the traffic is the heaviest.







PLATE SEVEN

SIMPLE THREE-CAR NEIGHBORHOOD GARAGE

Accomodations Provided for Automobiles in Triple Door Structure Which May Be Erected of Stucco at Moderate Cost

Designed by the Architectural Department of the Automobile Journal Publishing Co.

ONSIDERING the vast army of automobiles which one sees in the streets any day, it stands to reason that the housing of them all requires a great many garages. Of course there are numerous concerns, with large buildings, which are able to store many cars, but usually the man who owns a car will try to find some place on his lot on which to build a garage. If he is not owner of the lot, or if the condition of the lot is of a nature which did not originally take into account the possibility of the occupant acquiring an automobile, he will have to rent somewhere, and preferably somewhere near by. In our large congested cities, and even in some of our smaller towns which have often tried to be so citified that they have built on a closely cropped, square foot basis, there are many of what are called threefamily houses. On such a lot, if there is room for it, there might well be a triple accommodation garage against the day when each tenant may be the possessor of an automobile.

Or, if it is too much of a stretch of the practicalities to find each of three families under one roof owning a car of their own, there is still a field for the triple garage which is the subject of Plate VII in the series of designs made by the architectural department of the Automobile Journal Publishing Co. Compulsory renters of garage space are legion.

Of the owners of three cars in one neighborhood, one alone may have the ownership of his lot and that lot be at the same time a suitable site for a garage.

The stucco garage shown in this issue is designed to handle three cars in connection with a private dwelling. It has been laid out in the open type rather than in the individual compartments, as this is a cheaper method, omitting party walls and foundations. It is ample in area to care for three cars, as may be seen by glancing at the plan. The ground dimensions are 34 feet 8 inches by 24 feet, and the structure has a ceiling height of 12 feet. There are three doors, all swinging out, as this type is the most satisfactory on small garages. They measure eight feet wide by nine feet high.

Hollow tile is the form of wall construction which is shown, 12 inches thick, this making a fine water proof wall. Directly on to the tile workmen apply the stucco, which adheres to keys or grooves on the faces of the tile. Smooth face tile may be obtained, so that the inside may be left bare and painted, but the sketch shows plas-

ter on the inside, which helps to retain heat in winter. The stucco should be at least an application 1½ inches thick, to be of three-coat work, with a pebble, slap dash finish, thrown on the building at least four feet from the wall. Colored stucco may be used with striking effects, as to which varied suggestions may be obtained of the architectural department on application.

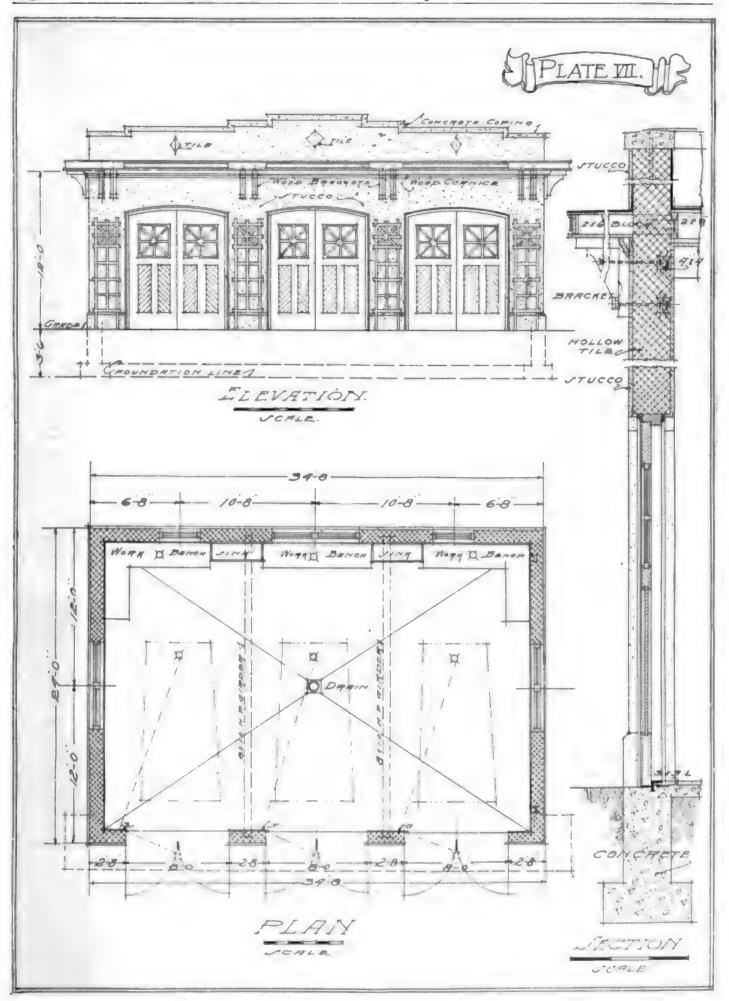
Concrete has been used for the foundation, which should be built as shown, having a depth of at least three feet six inches, so frost will not cause it to fail under its load. For mass concrete of this type the proportions of one part cement, three parts sand and five parts crushed stone will be found satisfactory. A concrete coping, as shown anchored to walls may be cast in position or made in moulds and placed. If the latter care should be taken in the pointing of joints with rich cement of a water proof nature.

The exterior finish or trim is of wood. This includes windows, doors, cornice and lattice grills, shown between the doors. Cypress or white pine make fairly good exterior woods when properly dried and painted. Door frames can be cut from three inch by six inch stock with staff beads as shown on both sides. In the section a small angle has been shown acting in a capacity of a door stop, which is also used for keeping out the weather.

The roof is constructed of two by eight-inch rafters, for which spruce will be found very satisfactory, placed two feet on centres, over which is placed ½-inch roof boards and a five-ply tar and gravel roof. Two eight by 10-inch hard pine beams are shown spanning from the front wall to the rear and these carry the roof, distributing their loads to the walls. Proper care should be given all points requiring flashing and lead or toncan metal should be used.

Sinks are provided in each garage and working room has been provided amply. There is plenty of space in which to work about all three cars, as may be seen. A drain located in the centre of each stall takes care of the water for washing, also any liquids that may fall on floor.

Heating in the most economical way would be from the house, by the wall or pipe system. Other means may also be applied. Now for the question, what will the three-car garage cost? To commit this item to a specific figure would be dependant on various conditions, but that \$1000 or a little less would cover this if care is exercised in letting contract, would be a fair statement.



The Misnamed "Pleasure" Car

New Designation of "Private Car" is Suggested for Supreme Utility Vehicle by English Writer

Alan Phillip, in the Autocar.

THE non-motor press still persists in perpetuating error of describing all but commercial motoring as "pleasure" motoring and all motors except commercial vehicles as "pleasure" cars; and, unfortunately, and surely most short-sightedly and unreasonably, many manufacturers still employ the same term and advertise "pleasure" cars when referring to any type of car other than a goods carrying vehicle.

Surely the time has come when this misnomer should be abandoned, for while a car may undoubtedly be a means of a pleasure, and, in a few cases, may even be acquired and maintained solely and exclusively for pleasure purposes, very large majority of cars are used for business, ordinary and necessary travel, journeys to town for shopping and visiting and for the requirements of recreation and health. To include all these uses in the sweeping and indiscriminating category of "pleasure" motoring is to ignore most obvious facts.

With many people today the object of keeping a car is simply to save the constant hiring of a conveyance for visits and short journeys of an endless variety, and for such individuals to bear the stigma of mere pleasure seekers every time the car is used is unfair and unjust. To exchange horses and carriages, with all the care and attention they demand, for a car with its far easier and less expensive upkeep, is surely no sign of growing seifishness or a surrender to the cult of

Of course there is pleasure in motoring, as there is in horse driving, but the degree of appreciation in each case is of infinite variety. Some people use a car without consciousness of pleasure in so doing, as some would prefer never to sit behind a horse; while to others the monotony of a journey, or the wearying routine of a district that must be frequently traveled, is invested with new interest from the mere fact that motoring is to them a pleasure in itself. But in such cases the pleasure is not the motive, but an "accident" in the run.

The use of the term "pleasure motoring" does not, unfortunately, fix itself on the few who deserve it, but has an unwelcome and perhaps inevitable tendency to enlarge its denotation and spread to the use of all cars that are not distinctively employed for trade.

Why not speak of pleasure locomotives and pleasure traveling by rail? For there are some to whom this is a very real pleasure, and many excursionists travel largely for pleasure purposes. Why not speak of pleasure cycling? For the cycle is largely used for pleasure. Simply because these things, which at first opened up a new and very welcome means of enjoyment, as well as utility, have long ere now become recognized means of transit, invaluable in the work and movements of national life, while the car is only just revealing its possibilities in these directions. Doubtless the war will do much to clear the air. Pleasure motoring is practically unknown today and the world in general, and the critics in particular, are seeing in stern and unquestionable fact that the car is supremely a utility vehicle.

Why not once and for all drop the term "pleasure car" and use the far more accurate and suitable term "private car" to distinguish this from the trade van and such utility vehicles? And why not urge manufacturers to adopt this course and help to remove a prejudice which dies so hardly in the breasts of the nonmotoring community.

"WOLVERINE SPEEDWAY SPECIAL" BEING BUILT.

The first model of the "Wolverine Speedway Special," which is to be manufactured by the Wolverine Motors, Inc., Kalamazoo, Mich., is being completed in a machine shop in that city. The new plant, now in course of erection, it is expected will be ready for operations by

The Wolverine will have a Wisconsin motor, Warner transmission, front and rear axles, manufactured by the American Ball Bearing Co., Cleveland, O.; springs made by the Kalamazoo Spring and Axle Co.

OLDFIELD MAKES NEW WORLD'S DIRT TRACK RECORD.

Barney Oldfield, driving his new freak speed car, the "Golden Bug," established a new set of world's dirt track records from one to 50 miles at St. Louis. Many of the records that he broke had stood for years. The records are as follows:

	New Record	Old Record
1 mile	00:45:00	00:46:20
5 miles	3:53:60	4:06:58
10 miles	7:56:20	8;16:40
15 miles	12:00:08	12:23:20
20 miles	15:52:02	16:25:60
25 miles	19:57:60	20:28:80
50 miles	40:47:06	40:57:80

At the conclusion of the run, Oldfield, when told of the records he had made. made the following statement:

"It is a vindication of my theory that American made speed cars are better than the foreign made brands. My new car is in every way a home product. It was designed and built by Harry Miller and equipped with Harvard piston rings, made by the Harvard Manufacturing Co., 3939 Magnolia avenue, St. Louis, Mo. Never before have I found a piston ring equal to the Harvard. Its high compression certainly gives a vast amount of extra power. I use them on both my cars and have found them extremely satisfactory."

GEVENTS

RACING CONTEST SCHEDULE.

SHOW CALENDAR.

Spokane, Wash., interstate fair. . Sept. 2-9 Toronto, Automobile Show, Canadian National Exposition...Aug. 25-Sept. 10 Milwaukee Show, State Park Fair,

West Allis Chicago, National Exposition of Ford Accessories, Coliseum.....Sept. 22-29 Dailas, Tex., Auto and Accessory Dealers' Association State Fair. Oct. 23-28 New York, National Automobile Show. Grand Central Palace. .Jan. 5-12, 1918 Washington, D. C., Washington Automobile Trade Association Carnival and open house week..Jan. 11-18, 1918 Montreal, National Motor Show of Eastern Canada, Montreal Automobile Trade Association Jan. 19-26, 1918 Boston, Boston Automobile Dealers' Association Show, Mechanics building

MEETINGS.

French Lick Springe, National Association of Automobile Accessory Jobbers.....Sept. 10-14 Atlantic City, N. J., Equipment Service Association.....Sept. 11-12 Atlantic City, N. J., Mid-season meeting, M. & A. M......Sept, 12-14









LENNON LIGHT PROTECTOR.

Headlight glare is the unnecessary evil that is being stopped in most states, since a great many of the automobile accidents are caused by the confusing light of improperly adjusted lights. The Lennon light protecter is designed so that when it is placed on a bulb the light beams are taken out of the air and thrown down on the road. This device is made in one piece, from high grade spring brass, and fits an under or oversize bulb without danger of injury to the bulb. It is heavily plated and polished inside and out, and having no delicate springs or extra parts, it will not break or get out of order.

The manufacturers guarantee that when this set of protectors is properly placed on the headlight bulbs and focussed, they will meet all requirements of laws in the various states.

Manufactured by J. H. Faw, Inc., 41 Warren St., New York City. Price \$1 per pair.

VORTEX GAS GENERATOR.

To get a perfect mixture is one of the fundamentals of ideal carburetion. Everyone knows that if a lump of sugar is placed in their coffee the drink will be sweetened to a certain extent, though it will be a question of time. If granulated sugar is used, the time is reduced. and if the liquid is stirred the sugar dissolves much quicker. This same condition is true of practically any mixture, and is equally true of gasoline and air The finer the gasoline particles are broken the more perfect the mixture. The Eastman vortex gas generator consists of two-gause vaporizing meshes, which are placed between the carburetor and intake manifold. The upper mesh is funnel shaped and so designed that the en tering gas is vaporized fully. It is said that with this device a mixture of one third kerosene and two-thirds gasoline may be used. The device is sold under a guarantee and a trial of 10 days is al-

for

' Voitex Gas Generator Applied.



Fawsco Combination Wrench.



Action of Lennon Light Protector.



Ever Safe Emergency Brake. lowed, with money refunded if the apparatus is not satisfactory.

Manufactured by Eastman Vortex Gas Generator Co., 16-18 East First Ave., Columbus, O. Price \$1.50.

EVER SAFE EMERGENCY BRAKES.

One cannot be too careful where the question of brakes is concerned, for upon them is dependent the lives of the passengers. The Ford emergency brake is of iron and to meet the demand for a lined brake band the Ever Safe emergency brake brand has been designed. This device is covered with a wire inserted, long fiber, asbestos brake lining material which can be renewed. The band is so arranged as to be adjustable, through shims, for wear, so that the lining can be used until nearly worn out. The brake shoe is made of band steel

and covered by a broad guarantee, the makers stating that they will replace any shoe broken in normal use upon receipt of broken shoe at their factory.

Manufactured by Never Break Products Co., Bangor, Pa. Price \$2 per pair.

PEERLESS TOOL KIT.

Motorists will be glad to learn of an addition to the regular Corcoran line of products of what is called the Peerless tool kit. Made entirely of sheet steel and measuring 22x9x7 inches, the kit presents an attractive appearance upon the running board. The finish is black enamel, two coats, baked on. The inside of the case is fitted with a wood tray, divided into compartments for screws, bolts or small tools.

Manufactured by the Corcoran Mfg. Co., Cincinnati, O. Price \$2.50.



Cork Insert Fan Beit and Brake Lining.

CORK INSERTS.

The postage stamp has won fame because of its faithfulness in sticking to its appointed work. It has a worthy rival in cork, in its ability to hold its grip. Almost every other substance known to man becomes polished under constant friction and wear. Not so with cork Cork avoids becoming slick and slippery as naturally as a duck sheds water. Some transmission fabrics become polished and slippery from service in the Ford car. The same is true of some fan belts, When this happens they do not function properly, the transmission bands do not grip, nor does the fan revolve, Cork inserts in both the bands and fan belts are said to be a perfect antidote for slipping, and since the buttons of cork do not polish or become hard, they do not lose their gripping qualities.

Manufactured by Advance Automobile Accessories Corp., Dept. G 3-1, 56 East Randolph St., Chicago, III. Write for prices.

FAWSCO COMBINATION WRENCH.

To lengthen your arm is seemingly a physical impossibility, but when taken as an advertising slogan in connection with a tool which gives the same result, it seems fairly appropriate. Many shirts and coats have been ruined by owners of Ford cars trying to reach under their car to test the amount of oil in the crank case. The tool illustrated herewith is just as effective as one's fingers and saves the annoyance and cuss words. It is a combination gasoline gauge, oil cock wrench and cleaner; and the claim is made that it will not only measure the gasoline in the tank, but provide the only sure means of learning whether there is oil in the crank case, as the pin will prove if the oil cock is stopped up or the oil exhausted. It is made of nickel plated, coppered, Bessemer steel rod, with a very high class finish.

They are put up in complete packages for the convenience of the trade and dealers are furnished with a very handsome counter display card, upon which is mounted one of the tools, which helps considerably in their sale.

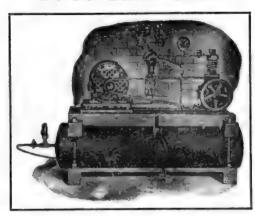
Manufactured by J. H. Faw, Inc., 41 Warren St., New York City. Retail price 35 cents.





GARDNER LINE

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Free Air Unit One of the many out-

WE HAVE A PUMP FOR EVERY SERVICE

Economical - Efficient and Cheap

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Riz Compressed Air & Drill Co

505 Howard St.

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For every make and model of motor car carrying an electric starting system. Replacements on cars no longer manufactured can be had promptly.

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Sell the Tonford. Meets demands for internal Gear and

Chain drives. Some prospects want one-some another.

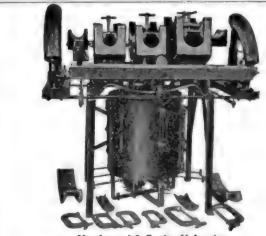
TONFORD

Chain Drive \$350 Internal Gear Drive \$390

The Tonford has been in use for more than a year. Thousands of owners attest its strength—serviceability—reliability. The Tonford attracts quality dealers because of its reputation for quality, unequaled at anywhere near the price.

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VANDERPOOL CO.,

Springfield, Ohio



Jointless Piston Rings

There are no substitutes for Jointless Piston Rings. The jointless affords every quality found in other rings and assures to all users a permanent, gas tight ring, more power, less carbon, increased mileage, less gasoline and lubricating oil.

The Jointless eliminates all usual piston ring troubles. It is finely constructed and its efficiency makes the Jointless a money making and saving proposition for any owner of a pleasure car or truck.

List Price \$1.00

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THE UNITED ENGINE & MFG. CO. Hanover, Pa.



washing it is well to see that the electric system is protected from any water that may leak in, causing trouble in starting the engine. The later models, however, are almost immune from this trouble.

It is not necessary to use soap every time the car is washed, if it is washed often. If the car becomes spotted with road oil the oil may be removed with a small piece of cotton waste or sponge moistened with gasoline. The spot should be rubbed lightly and will quickly disappear. It should then be washed with soap and water.

To preserve the finish the car should be polished with prepared body polish on a damp cheese cloth, making a wonderful improvement if the polish has become a little dull.

The car should not be washed while the engine is hot, or the finish will be taken off the hood and radiator. The car should not be left standing in the sun or the varnish will check and peel, presenting a poor appearance.

Mr. Stiles' letter shows that he knows how to keep his car looking well and contains a number of helpful points. There are a number of liquid soaps, polishes and cleansers now on the market which remove the mud and road oil by chemical means, without damaging the finish. Perhaps it is better to use a preparation that is known to be harmless to the finish rather than take the chance of damaging the finish by the application of gasoline, though gasoline has usually no effect on the varnish.

The application of body polish or prepared wax is undoubtedly the best method of preserving finishes, since the wax presents an extremely hard surface, through which road oil does not penetrate.

KEEPING BODY FINISH IN CONDITION. (Joseph Deegan, New York, N. Y.) Second Prize Letter.

For the sake of beauty the finish of the body of a car must be considered as important. To a certain extent the finish is very delicate and it will not stand much friction or rubbing. Though it will not last as long as the paint, with a little care, and the expenditure of a little time, it may be preserved for quite a time.

Prevention is better than cure, and for that reason the car should not stand in the sun, or the finish will be checked and cracked and the gloss destroyed.

The first step in washing is to flush the car well with a low pressure stream of water, flushing off all of the loose dust and dirt. Next take a pail of luke warm water and with a clean sponge, which is to be used on the body only, carefully wash off all caked up mud and dirt, taking care not to scrub too hard, or scratch the finish. In the water should be dissolved a good quality of automobile soap, or ivory or castile soap.

After all of the dirt has been removed the body may be polished with a chamois skin and given a coat of prepared wax or other body finish. The chamois skin used for this purpose should be rinsed frequently so as to remove parti cles of grit and used for the body only.

The running gear may be washed in the same way, using an extra set of sponges and chamois, since to use the same chamois on the body would result in scratches or deposits of oil from the running gear.

Road oil may be removed by using kerosene or gasoline in very small quantities and rinsing it off as soon as possible.

GEARS GRIND WHEN CHANGING SPEEDS.

(S. R., Durham, N. C.)

I have recently purchased a Chevrolet car and though I have owned a car for a long time that did not require the changing of gears, I cannot seem to change the gears of my new car without causing them to grind excessively. Can you give me any advice on this subject?

The changing of gears, noiselessly, is largely a matter of experience and usually depends both upon the operator and the car. To understand the theory, let us go into the construction and action of the gearset and clutch arrangement.

The gearset, which consists of a series of gears which are mounted on three shafts, is connected directly with the rear drive member or propeller shaft. When the clutch pedal

Friction starts Grinding before Grease begins Lubricating

Common grease needs heat to soften it before it can lubricate. The parts grinding together must furnish this heat in the shape of friction. Meanwhile these parts get no lubrication. And Friction-getting a good start-is never caught up with by grease.



Lubricates Instantly—and

NON-FLUID OIL lubricates the second your car moves from rest-and every minute it is in motion. Doesn't give friction a chance to start. It never melts, never leaks out, is much purer and longer lasting than any grease you can buy.

If you buy lubricants on the same basis that you buy tires purely on service, you'll ask for NON-FLUID OIL every time. Get "K-oo Special" grade for pears; "K-ooo" grade for bearings. Sold at your dealers in orange-colored cans only.

Write for a free booklet, "Lubrication of the Motor Car."

New York & New Jersey Lubricant Company 165 Broadway New York City

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Automobile Journal

Is the oldest Automobile magazine published in America devoted wholly to owners of pleasure cars.

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tion of the Paige line will explain why. Write for complete particulars

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Times Building

Pawtucket, R. I.







Perhaps the seeming lack of power and the joint breakage are due to the same cause, excessive friction at some point in the transmission or rear axie. We would suggest that you jack both wheels, remove all the spark plugs and engaging each set of gears, separately try cranking the engine with the hand crank, being sure that the spark is not on so that the engine will be set on fire from possible vapor coming into contact with the plugs. Any excessive friction will be noticed, since the engine should turn very easily under the above conditions.

If there is not excessive friction the universal joint trouble may be due to either or both of two causes. Shafts out of line, caused by improperly centred couplings, or by poorly fitted coupling bolts. The bolts should fit the holes and have absolutely no play when set up. If the holes are large or out of round, there is a tendency for the couplings to slip against each other, bringing great strain upon the bolts every time the engine is coupled to the transmission. Make a careful examination and should the holes be out of round, have them bored larger and larger bolts used, or possibly a new joint.

Loss of power in the engine may be due to either of two causes, poor ignition or improper carburetion. Since you are sure that the ignition system is all right and if you have tried the spark at all of the plugs, we will not go into the possible ignition troubles.

The first thing for you to find out is whether or not the compression is good. If the compression is poor it may be due to gas leakage by either the pistons or valves, and is probably the reason for loss of power. If the leakage is past the pistons you have your choice of two remedies, either have the cylinders rebored or introduce about two teaspoonfuls of of Dixon's flake graphite into the carburetor air intake while the engine is being run. Since the latter method costs but little, it is well to try it first. In case the engine skips after this has been tried, remove and clean the plugs, as the graphite sometimes causes them to foul when it is first put in. One cleaning is usually sufficient.

The remedy for leaky valves is grinding, though the graphite method is sometimes effectual in the case of pitted valves.

Should the compression prove to be good, indicating that the pistons and valves are properly functioning, make a careful examination of the intake line between the carburetor and the engine. Be sure that the manifold is firmly against the block, and that there is no leak beween the manifold and carburetor.

A method of determining whether any leakage is present is as follows: Fill a squirt oil can with gasoline and start the engine, throttling it down as low as possible. Starting at the manifold engine connection, squirt a small amount of gasoline on to the joint, noting the effect upon the running engine. Should the engine accelerate or slow down a leak in the intake is indicated and a new gasket should be put in. Make the same test at all manifold connections, wiping off the gasoline at each point immediately after each test.

The spark plugs and plug caps often present places for gas leakage, as do also the valve stem bushings or guides. These points should also be given the gasoline test, as well as a careful examination.

Carefully check up the valve timing and valve tappet adjustments. Turn the engine flywheel over until the mark IO is under the pointer. The inlet valves on the cylinder having the piston uppermost should begin to open. Check off all of the valves by the marks on the flywheel. C means top centre; IO means inlet open; IC means inlet closes; EO means exhaust opens and EC means exhaust closes.

After the engine has been warmed up adjust the valve and tappet clearance so that there is not over 1/32 or less than 1/64 of an inch between the valve stem and tappet.

Poor spring action often causes the valves to act sluggishly, thereby decreasing the power, usually causing uneven running. Each spring may be tested separately by inserting a screw driver between the coils while the engine is being run and pressing the coils farther apart, the effect upon the engine being noted. If the engine is speeded up by this means a new spring should be put in.

We would suggest that you make the following test of the fuel line. Place a catch basin or pail beneath the carburetor and open the drain plug so that the gasoline will flow out. If



THE well read and fully advised motorcar agents and users recognize its superiority and dependability, and therefore recommend

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Guard against this waste by attaching a

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blade to fit any dismeter of hose from 1-4 in. to 5-8 in.

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the fuel flows in an even stream, after the bowl has been drained, it indicates a clean fuel line. Should the stream be small or unsteady, clean out the line with a stiff piece of wire; also see that the tank is properly vented. Before getting a new carburetor, as you suggest, it would be best for you to take the old one to the Cadillac service station and ask their opinion on it. Perhaps the needle valve has worn, or the air valve spring is too weak. Since the carburetor was designed for this car by experts it should give satisfaction.

Practically any of the standard makes of carburetors should be applicable to your car. In writing the makers for specifications give the name, model, number and year of your car, as well as the size of the intake manifold.

RESTORATION OF THE OVERLAND. (Continued from Page 16.)

Before the front part of the main shaft can be removed the propeller shaft coupling must be pulled from the shaft and the main drive gear lock nut unscrewed. The gear and shaft may then be drawn into the case and removed. The ball bearings, with their outer races, may be driven out of the case if replacement is necessary.

Both the countershaft ball bearings are held in place by retaining caps. The cap screws should be removed and the bearings driven out. The shaft can then be slipped through the back of the case, leaving the three gears inside the case.

The transmission reverse idler shaft is held into the case by a nut on the end of the shaft. After this nut has been taken off the shaft may be removed and the double gear taken out of the case.

Before reassembling the gearset, one should assemble the pinion and drive shaft with the ball bearing in place, putting the correct number and sizes of liners between the bearing race and the shoulder on the shaft, so that there will be no play between the bearing and the shaft assembly.

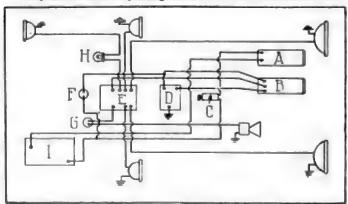
Rear Axle and Differential.

The rear axle is of the three-quarter floating type and the axles and differential may be removed without disassembling the housing.

After the rear axie housing cover has been removed the differential and adjusting collars, with the bearings, are exposed. At the outer extremities of the differential and mounted on the shafts are the adjusting collars. These collars are made in two pieces, held together by two machine screws. Screws should be loosened so that the axles are free.

The axle assembly may be placed upon horses, with the wheels free of the ground, so that the wheels and axles may be drawn from the housing and leave the differential assembly in the housing.

Adjacent to the adjusting collars are the differential bear-



Overland Wiring Diagram: A, Starting Motor; B, Generator; C, Starting Switch; D, Cut Out; E, Switch and Junction Box; F, Ammeter; G, Horn Button; H, Dash Light; I, Storage Battery.

ings, which are fitted with caps. Upon removal of the caps the differential gearset may be lifted from the housing.

The differential gear case is disassembled by the removal of the eight retaining bolts. If the master or drive gear is loose on the case it should be reriveted or bolted so that there will be no lost motion.

Before finally replacing the differential gear case the dif-

















1917 SALES

FOREIGN BUSINESS \$90,958,243.00

From National Automobile Chamber of Commerce,
7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Per Cent. Decrease in Shipments to Great Britain, France and Russia During Last Fiscal Year—Big Increases to All Other Countries—Shipments Total 80,811 Cars, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less—Fewer Trucks and More Passenger Cars.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917. the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analyzing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased shipments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe.

Exports of commercial vehicles and passenger cars during the two years were as follows:

916 191

No. Value No. Value Commercial.... 21,265 \$56,805,548 15,977 \$42,337,315 Passenger..... 56,234 40,660,263 64,834 48,620,928

Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14,468,-233 less, the shipments of passenger cars increased by 8600 and their value by \$7,960,665.

Great Britain and France were still our largest markets, despite their heavy falling off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all trucks and amounted to \$14,691,460, as compared with \$19,137,904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries, Holland and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries, Canada is America's best customer for motor cars, having increased her purchases by nearly \$4,200,000—from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647—an increase of \$1,243,735 over the year before.

The most remarkable increases, however, are shown by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took automobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States exported in the last fiscal year 23,435 automobile engines, valued at \$2,844,406; tires worth \$12,330,201 and parts worth \$27,284,932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

If you are a member of the Foreign Trade Bureau conducted by the Automobile Journal Publishing Company you can reach 8,000 foreign buyers of pleasure cars, trucks, fittings, supplies, accessories, tools and equipment in more than 81 foreign countries.

ALL FACTS AT REQUEST

Automobile Journal Publishing Company
TIMES BUILDING PAWTUCKET, R. I.







WHAT is built in a car? Service. And again, service. This is the keynote of the worth of an automobile and any attempts to estimate in any other terms the most valuable transportation vehicle which has ever been brought forward for the use of man in any age is simply a futile effort by some ill-advised individual, body or publication to throw dust in the eyes of 4,000,000 car owners. The article "Service Value of Used Cars Vs. Set Prices" in this issue points out again with added emphasis that the real worth of a used car is lodged in its condition and serviceability, and that this does not depend in the slightest degree on the year of the model. Without doubt the estimation of a car's value simply on its age, without regard to its other points of merit, is a lazy man's way of wasting hundreds of dollars of other men's money, if nothing worse. The Automobile Journal stands for the service value in a used car every time, and especially as against that arch foe of manufacturer, dealer and owner, the set price schedule based solely on the year and model of the car.

N RESPONSE to a number of requests from our readers addresses are supplied in the key to used car bargains published in this issue. This compilation is carefully made from the press of the several cities represented and, on the strength of press reliability and general business integrity, commends itself to the motorist for the information it contains.

PERHAPS fewer motorists than is popularly supposed break down their tires by running in the car tracks. But legions of them wrestle with the problem of removing carbon deposit, which is the subject announced for contributors in the idea exchange.

VOL. LXIV. SEPT. 10, 1917. 'NO. 3. TEN Service Value Vs. Set Prices... 9 Only Reliable Criterion on the Worth of Used Cars. Overhaul of the Maxwell Car...12 Lexington Minute Man Six.....15 Queensborough Auto Plants....17 The Motor Enterprises Only Ten Minutes from Broadway. Garages—Plate VIII......20 Frame Garage of Novelty Siding for Two Cars. Food Pledges for Motordom....22 National Automobile Association 23 On Lighting Law Conflicts and Reciprocal Enforcements. National Highway Association...25 Builetin on Conditions of the New England Highways. New York's New Motor Laws....26 The Autumn Motor Girl......27 Advance Modes in Coats and Suits for Fall and Winter. By Mrs. A. Sherman Hitchcock. The Jones 6-60......29 Ambu, the Trouble Finder.....31 Graphic Items of Motordom.....32 Current Used Car Values......33 Accessories and Equipment....37 News of the Industry......39 Queries-Idea Exchange......40 Advertisers' Index..... 2 Treasurer . . WILLIAM H. BLACK Secretary . . . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

WHAT kind of a car do you own, and are you reading every one of the construction stories that appear in the Automobile Journal? No matter what car you own you should read every story for the reason that in each article is discussed some general subject that may be relative to your car. The first story dealt with the Ford car, and took up in detail the method of grinding valves: the second article dealing with the Chevrolet, gave directions for scraping bearings; the third. dealing with the Overland, gave some cooling system hints that are applicable to many cars. Each story contains, not only details of construction of a special car, but also repair kinks that might be invaluable to the new owner in repairing his own car, even though it might be of a different make. Read all of the stories, there is no better course of instruction than this series.

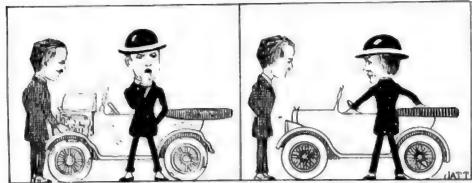
S UBSCRIBERS sending notice of a change of address should bear in mind to send the old address as well as the new one so as to insure that the change may be effected promptly.

CURRENT opinion in the automobile industry is that war demands will speed, rather than check, national expansion. Every passing day brings a fuller realization of the imperative need of other means of carrying than are at present supplied by the railroads, rivers and canals. While it is regarded as certain that the present transportation facilities outside of the automobile will feel the impetus of national expansion, and all will be called upon to sustain their share of the extra burden, it is also strongly shown that from the very nature of things in this country-its wide expanse, the necessity for quick communication — the falls upon the automobile.









A Car Mechanically Sound Needs Also to Be Made Pleasing to the Eye in Order to Win a Customer's Favor.

The one big fact that cannot be evaded is that the automobile owner knows the service worth of his car. He is acquainted with its mileage record and condition as no one else can be. Considerable stress is sometimes laid upon the owner's high estimate of his car as being due to sentimental associations. In this hardheaded business age, however, the service a car gives is taken of far more account than sentimental feelings. It establishes a form of worthy pride resting on a solid foundation; a factor demanding recognition and weight in all transactions affecting the disposal of a man's useful property. The set price plan advocated by an individual, association or publication runs counter to this and many others of the owners' best interests. Nor are the manufacturers and dealers benefited until they discard it. It is more than interesting in this connection, therefore, to note that there is an upward trend in the used car market and all indications point to the development of conditions that will parallel those already surrounding the automobile trade in England, where, owing to war conditions, there is such a light production of passenger cars that second hand machines up to five years old bring from 75 to 95 per cent, of their original cost and in some cases more than they were originally sold for.

Dealers, who on the impulse of the moment may have indorsed the fixed price idea, soon realize what an impossible proposition they are fostering. It does not take much time or any great reasoning to see the futility of appraising the value of a used car by a chart or set form, arbitrarily establishing its market value.

The Problem in Other Merchandise.

It begins to dawn on the trade that the problem of the used car is in no way different to that which has been solved in the typewriter, cash register, adding machine and in similar lines of trade. It has been looked upon as a side issue and given less attention than it really demands, with the result that many dealers did not come to realize the magnitude of the problem until they found themselves with a white elephant on their hands in the shape of a large number of used cars. In many instances the profits of several years' business were tied up in used cars before the dealer awoke to the necessity of applying a remedy.

There was absolutely no way of avoiding the problem, as nearly 80 per cent. of all new business is contingent on a trade-in of a second hand car, so progressive dealers studied out ways and means of meeting the situation.

At one time used cars were sold much after the manner of junk, "as is" being a term generally used as a basis of sale, meaning that the seller guaranteed nothing and the buyer took the car unconditionally. This method of distributing the used cars naturally was a failure, as it incited suspicion at the start and made prospective motorists particularly wary.

Car dealers and used car dealers soon perceived that there is something radically wrong in that method of merchandising, as no other line of goods was ever successfully marketed on such a plan.

Winning Public to Used Cars.

The people who bought cars on the "as is" plan, when anything went wrong, felt that they had been imposed upon and the seller could never figure on that customer as a prospect again. The heavy depreciation that was charged against most cars was responsible for this condition and the condition would still obtain in the trade if the best friends of the motor car had not discovered that a remedy lay in maintaining a higher value for the used car, enabling repairers to fix the cars, put them in good running order and stand back of them with some sort of a guarantee. This business policy not only makes it possible for the dealer to dispose of his used cars more readily, but in turn has created a far

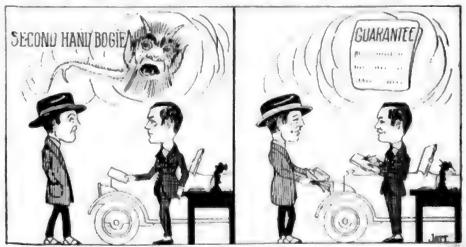
more favorable attitude on the public's part concerning the values of used cars. A glance at the advertisements in the press, some samples of which are shown on pages 33, 34, 35, 36 of this issue, reveals a new era in the used car business. Practically every dealer offers some kind of a guarantee and they make specific statements as to the condition and appearance of the cars offered, while others go further and give a certain amount of free service with every car sold, to be used whenever needed. The extent of this free service, however, is regulated in accordance with the price paid for the car.

In fact, the business today is being operated on a similar basis to that employed in the distribution of new cars and some of the dealers go to the extreme of practically rebuilding a car before offering it for sale. They not only restore its mechanical condition in every respect, but also renew the finish if it is necessary. This plan not only gives the users of that class of car considerable pride in its ownership, but it serves to maintain values so that it is always easier to market a new car of that make and the used cars can be handled with greater leeway owing to larger margin of profit afforded.

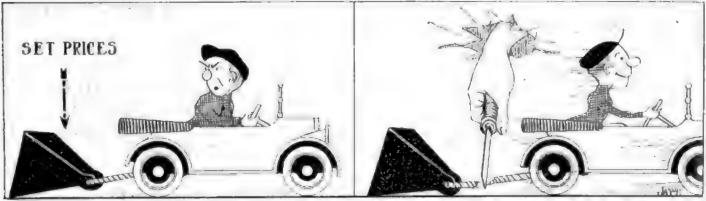
Cultivating the Trade.

Used car dealers even go so far as to cultivate their trade carefully, with the result that they can sell the same customer again and again, and it is a known fact, from figures kept by one dealer, that many motorists buy several used cars before they buy a new car.

It is far easier also to convince a person that the service claimed is actually contained in a car if it makes a good appearance. Everyone is susceptible to impressions and is largely influenced by them in making a purchase of any kind of article, which fact makes it more difficult to dispose of merchandise if its appearance is poor. Some merchandise can show marked wear externally an yet its service value can easily be recognized, but in the case of an automobile, scratched paint, dented bodies and guards, ragged tires will prejudice a machine in a man's eye to a point where, even if it is mechanically perfect, the



The Very Name of Used Car Brings Fearful Visions to Many Unless Met with a Straightforward Proposition.



Cutting the Incubus from the Used Car Lets It Speed Away on Real Value and Affords Relief to the Industry, Which Has Been Dragging a Heavy Load Unnecessarily.

dealer will have great difficulty in establishing the fact to the customer's satisfaction.

An expenditure of \$25 to \$50 on the car would not only make it presentable, but would easily enhance its value in the customer's estimation to a point where the dealer could not only make a quicker sale, but a sale at a price that will return the money outlaid for renovation. The worth of any article does not rest solely in its intrinsic value, but is based also on its general attractiveness, which fact shows that any treatment a car may receive enhancing its appearance is actually increasing its market value.

Comparison with British Markets.

The conditions in this country governing used car values seemed to have evolved along similar lines as in England, where prices for a while showed a marked depreciation, until the business was placed on a sounder basis, when they advanced rapidly.

When it was announced in England last April that no more gasoline licenses would be issued to operators of passenger cars, used cars were almost a drug on the market and a month later there was practically no trades for them except at sacrificial prices. By the latter part of June and during July the prices for used cars in England began to strengthen materially and today are very high, as stated earlier in this article. The advance in England was of course due to the fact that few car manufacturers continued the production of cars when war came. Hence many business men, who were in dire necessity to provide transportation facilities, bought passenger car chassis and fitted them out as commercial vehicles. The practise has increased steadily. In fact, the demand is so great that a large number of advertisements are inserted in the trade press and daily papers in England inquiring for used CATS.

Some idea of the extent to which prices have advanced there is shown in a report brought to this country recently by an automobile dealer of New Zealand, who stopped in England on his way home. He states that light cars which sold at \$1000 to \$1500 several years ago now have a market value of from \$2500 to \$3000 regardless of their age.

Recognition of Service Value.

There is no doubt, in view of the pres-

ent trend of events in the situation, that people in this country will be as quick to recognizes the service value in the used car as the people of England. Immediately they begin to wake up to this fact the question of car depreciation will cease to trouble either the dealer or owner. Many manufacturers in this country have already issued warnings of a scarcity of new cars to be felt this season, and there are many elements in the situation to warrant a belief that the scarcity will materialize. If it does similar conditions surrounding the used car market may be expected to obtain here as obtain in the present in England. When once fairly pointed in the right direction people will quickly become educated to the fact that car value is really measured in service miles and performance, and not in the date of manufacture or lines of style.

Such a situation of course will redound to the benefit of the car manufacturer and dealer, as it will place the new car on a sounder market basis, where the buyer will not be deterred from fear of the heavy depreciation he has been obliged to stand in the past and motorists will be more inclined to buy a new car each year than ever before.

High Second Hand Value.

One of the leading car manufacturers of the world, located in England, uses whole page advertisements in the trade press to bring to the attention of the public the high second hand value of his products as a means of indicating their quality. The last ocean mail brought a very interesting advertisement of this nature, which is as follows:

WHATS BUILT IN THE CAR. The excellence of a production can be gauged by its second hand value. Standard 12-16 horsepower SUNBEAM cars made by us in 1914 and sold for \$446-\$1000 retail, have a present market value of from \$500 to \$595 and that after three years of hard service.

Here is a strong illustration of the car's value being determined entirely by its service record and possibilities.



RACING CONTEST SCHEDULE.

Providence, R. I., speedway race, cham-
pionshipSept. 15
Allentown, Pa., track raceSept. 22
Trenton, N. J., track race Sept. 28
New York, speedway race, champion-
shipSept. 29
Danbury, Conn., track raceOct. 6
Uniontown, Pa., speedway raceOct. 6
Richmond, Va., track raceOct, 13
Chicago, speedway race, champion-
shipOct. 13
New York, speedway raceOct. 27

SHOW CALENDAR.

Milwaukee Show,	State	Park	Fair,
West Allis		Be	ept. 9-15
Chicago, National			
Accessories, Coli	seum	Sep	ot. 22-29
Buffalo, N. Y., clos	sed car	show,	Auto-
mobile Dealers' A	Associat	ion	Oct. 1-6
Syracuse, N. Y., fin	st annu	al close	ed car
show		00	t. 22-26

MEETINGS.

-
French Lick Springs, National Associa-
tion of Automobile Accessory Job-
bersSept. 10-14
Atlantic City, N. J., Equipment Service
AssociationSept. 11-12
Atlantic City, N. J., mid-season meeting.
M. & A. MSept. 12-14

















PLATE VIII.

INEXPENSIVE WOODEN GARAGE FOR TWO CARS

Frame Building Walled With Novelty Siding and Entered Through Sixteen-Foot Doorway Equipped with Sliding Doors

Designed by the Architectural Department of the Automobile Journal Publishing Co.

IN THE preceding articles on garages the more elaborate types have been dealt with. The design this issue is of a less expensive type, the structure being of wood throughout and so simple in detail that the average man, handy with tools, could do most of the labor. As labor incurs about 60 per cent. of the cost of a building the saving that can be effected by doing some of the erecting work is considerable.

The garage is designed for a private estate, either to house the owner's two cars or to permit of renting space which will more than pay the builder interest on the investment. In describing its construction the detail can be best followed by starting with the foundations and working up. The foundation walls are 25 feet long, 20 feet wide and 10 inches thick extending below grade, three feet six inches with a footing 18 inches wide. An underpinning of brick, five courses eight inches thick, is laid on the foundation walls and adds greatly to the finish of the garage.

The concrete should be of a mixture of one part cement, two and one-half parts sand and five parts of screened gravel or crushed rock for the coarse aggregate. Before erecting the superstructure it is a good plan to finish the floor if cement is the material to be selected. The mains for any gas or water connections should be first installed and the hole for the pit dug, after which the ground within the foundation walls should be tamped down hard with a heavy pounder.

Two different mixtures are used in laying the floor, which should be at least five inches thick. The first layer, four inches, is made of one part of cement, 2½ parts sand and five parts of crushed stone or coarse pebbles. The surfacing layer is placed before the first layer is set and is mixed of one part cement and two parts sand. A gentle inclination of the surface toward the drain in the centre aids in rapid drainage when washing the cars.

Where the location is such that it is either impossible or inconvenient to make sewer connections for the drain, a French drain may be constructed which will answer the purpose. A French drain is installed by burying a barrel filled with rubble beneath the drain inlet.

The frame of the building is erected on 4x6-inch sills of 2x5-inch studs, 12 feet long; 2x8-inch spruce rafters on 4x4-inch plates. The structure is walled in with novelty siding, which makes shingling or the use of clapboards unnecessary.

On the roof seven-eighths inch boarding is used with shingles.

A first grade cedar shingle is the best investment in the long run and should be laid not more than $4\frac{1}{2}$ inches to the weather. A four-inch lap is better and the shingles will give longer service. Galvanized nails only should be used in laying the thatch.

Roof drainage is provided for by a wooden built in gutta with a 3x4-inch wooden conductor.

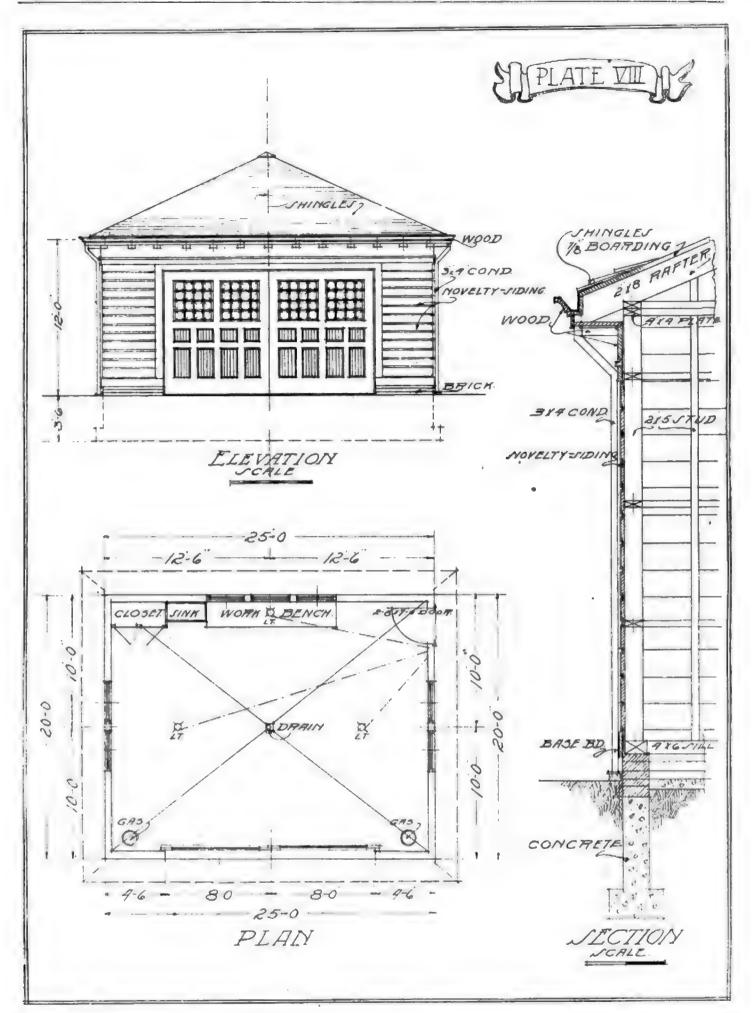
A 16-foot doorway with two sliding doors affords ample entrance room for both sides of the garage and these doors are 2¾ inches thick. Two large windows are provided in the upper half of the doors and the same number are provided for in the plans on each end and for three in the reardirectly over the work bench. These windows may be double hung or hinged as the owner prefers. A small door at the side in the rear is provided as a general entrance to avoid handling the larger doors when unnecessary.

Working facilities are increased through the convenient location of closet, sink and work bench at the rear. One light is located directly over the bench and two others on the ceiling immediately above the centre of the car positions.

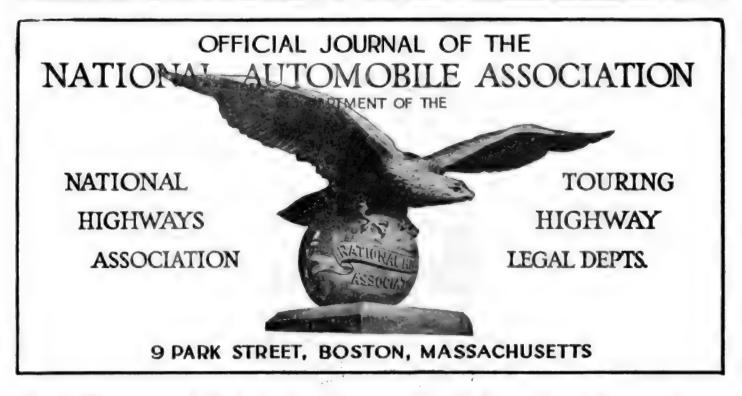
For heating, steam or hot water are preferable to the other methods, and can be used most advantageously when connected with systems in the home. The standard method of using wall pipes for carrying the water or steam gives efficient service, as it distributes the heat in the location where needed most. Connections with the house water supply should also be made when possible, as water is needed for many things in the garage. The trenches and conduits for carrying these pipes into the building should be laid out and constructed before the foundation and floor are constructed, otherwise the installation will call for considerable extra labor and restoration work.

The ordinances in cities show quite a wide difference in regard to building regulations, line walls, etc., a fact which would require inquiries from the building inspectors in case the builder was not employing the services of a contractor, so as to be on the safe side.

The structure when completed is serviceable and can be so finished as to enhance the appearance and value of the average estate. Its cost would vary from \$350 to \$400 in accordance with the outlay for labor or materials.







Conflicting Lighting Laws Call for Uniform Law

THERE is an urgent need for a uniform law relating to the headlights on automobiles, a law which shall be the same in every state, wisely says the New Haven Register, which shall clearly define conditions under which lights must be lighted, how far they shall illuminate when lighted and to what height above the ground the light shall extend. At present the various state laws are a medley of rules and regulations, and dealers shipping automobiles to various parts of the country are put to a great deal of trouble to see that the cars are equipped according to the laws of the state in which they are to be used.

A good beginning for the enactment of national laws to govern the entire problem of the motor vehicle might be made with the lighting regulations. The time is coming when such laws must be enacted, not only for the protection of the public, but for the protection of the automobile owner. There should be a set of laws which would make uniform conditions for driving, speed and lighting in every state in the Union, but it is admitted that the time is not ripe for such enactment at present. A fine opportunity for the trial of such national legislation is given in the chance to work out some law for uniform lighting.

Investigators have found that nearly all the states have tried to prevent the temporary blinding of an approaching driver and have specified the use of "dimmers."

The following states now require that the beam of reflected light from front lamps shall not rise more than 42 inches above the level surface of the road on which the vehicle stands, unless the lamps are fitted with lensee or dimming devices to diffuse rays or lessen the intensity of the light: California, Connecticut, Florida, Iowa, Nebraska, New York, Nevada, North Carolina, North Dakota, Ohio, Oregon, Texas, Utah, Vermont and Washington.

Other states prescribe dimmers that must not reduce the volume of light so greatly that the lights cannot be seen from a distance varying from 200 and 500 feet ahead. Some states prescribe white headlights, others permit the use of colored glass. Today, to comply with all the state laws, the driver of a car

must have lamps which will prevent throwing a dazzling beam of light more than 42 inches above the surface of the road 75 feet ahead of the car, yet which will not prevent them from being visible 500 feet ahead or giving sufficient white light 250 feet ahead and 10 feet each side of the road 10 feet ahead of the car. Even then he may run afoul of some city or town ordinance. The time is coming when the problem of regulating the automobile must be taken up by the federal government.

Trying Reciprocal Law Enforcement

Connecticut and Massachussetts Make an Agreement to Punish Reckless Motorists

COMMISSIONER of Motor Vehicles Robbins B. Stoeckel has entered into a reciprocal agreement with the state highway department of Massachusetts whereby a resident of either state who violates the automobile laws of the other can be called back for a hearing in the state where the violation took place. In case the person does not attend the hearing his driving license will be taken away by the commissioner of his own

Commissioner Stoeckel was the originator of this agreement and is making arrangements to have the agreement hold for all the New England states, as well as New York and New Jersey.

Commissioner Stoeckel stated that this agreement is aimed to eliminate reckless driving by out of state motorists. The commissioner will make an auto tour and

arrange conferences with the automobile commissioners of the other New England states, explaining the agreement and making arrangements to have it recip rocal for all the states.

CONNECTICUT.
MYSTIC. Automobile drivers on the Groton side of Mystic are being taught to obey the state laws through the persistent work of Patrolman Parker and a great change can be seen in the way machines are being handled. Mr. Parker is only on night duty, but is usually on Main street several hours during the days and keep his eyes open for violators.

MERIDEN. A new traffic order of the police department which the jitney drivers may think works a hardship on them, is the exclusion of all public service cars on East Main street from Colony street to the railroad grade crossing.

Police Activities

Traps

Traffic Rules

OUR reports from various points in New England are condensed herewith.

RHODE ISLAND.
WESTERLY-WATCH HILL, Motorists should not forget that it is illegal to pass trolley cars when stopped and taking on or discharging passengers. Arrests are being made.

NEWPORT. Motorists should slow down and sound their horns at intersecting ways, as the police are prosecuting

violators of the law.

PROVIDENCE. Traps in East Providence, one between Red Bridge and Six Corners, at Waterman street, near Bay View College, are being operated; also on North Main street in Providence. Many arrests have been made and many are likely to follow unless motorists drive reasonably and carefully.

PAWTUCKET. The police of this city are enforcing the 15-mile speed limit on Main street and also on Broadway and

West avenue.

RIVERSIDE. Traps have been set in Pawtucket avenue and on Bullock's Point and arrests are being made.

CONNECTICUT.

NEW HAVEN. Between Kimberly and Howard avenues a trap is being operated by officers in civilian dress. The officers are mounted on motorcycles.

HARTFORD. Many arrests have been made and heavy fines imposed upon motorists violating the speed law on Farmington avenue.

MASSACHUSETTS.

MARBLEHEAD, Silent policemen have been stationed at the junction of Atlantic avenue and Ocean streets at Gilbert's corner to warn motorists to be careful of this dangerous place and it will be well for motorists to govern themselves according to instructions upon them.

SOUTHBRIDGE. Much complaint is being made about the wild driving of autoists along Worcester street from Charlton street to the Charlton-Southbridge

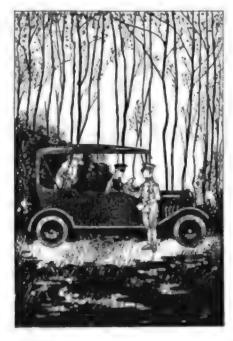
FALL RIVER-ASSONET. Many of motorists arrests are being made in Assonet for violations of the motor vehicle laws.

SPRINGFIELD. While there has been marked improvement owing to the many arrests of motorists for violations of the eight-foot law in passing stopped street. cars, there is still considerable violation and we warn all motorists to bear this state wide law in mind while violations are being prosecuted by any municipality

READING. On the Andover turnpike. About 1½ miles beyond this town a trap is being operated. The police are using a Ford car to trail violators.

NORWOOD. Near by the Norfolk hospital a trap is being operated by the police. The trap is on a hill and a motorcycle officer is stationed there.

IPSWICH. The police of this town are arresting motor speding motorists on county road and at Wind Mill Hill.



SOUTH HADLEY. A trip one-eighth mile long is being operated on the South Hadley Centre road by town and state officers.

SANDWICH. The police are endeavoring to force motorists to drive not faster than eight miles an hour through this town.

QUINCY. The police have been ordered to stop all speeding on automobiles to and from Quincy Point to city proper.

PLYMOUTH. Traps to catch over speeding motorists are being operated by the police of this town.

METROPOLITAN PARKWAYS. The metropolitan police on Blue Hill Parkway, Revere Beach boulevard and other parkways are making many arrests of motorists for overspeeding, failing to slow down and give a timely signal and for dazzling headlights.

MASSACHUSETTS. Many arrests are being made by local police and inspectors of the highway commission for failure to properly dim headlights on automobiles. We would suggest that motorists should at once attempt to comply with the law.

RHODE ISLAND

PROVIDENCE. Traffic violators are meeting with considerable difficulty in evading the law these days, with officers, in uniform on the watch for them at both Division and Main streets at the Four Corners near the sea. View station. Particularly are violators curbed at Division and Main streets, where the need has long been felt for a traffic officer.

MASSACHUSETTS.

WORCESTER. (Shrewsbury street.) Worcester's noted speedway is going to be made safe. Automobile and horse drawn vehicle traffic bound in the general direction of Lincoln Park, Boston, and points east, is to be shunted to the south side of the boulevard, while the Worcester bound traffic is to monopolize

the other side. A petition for such revision will soon be placed before the council committee on streets. At present autoists are using the north side of Shrewsbury street, traveling in both directions, while the horse drawn vehicles trot up and down the opposite side.

MELROSE. Both the mayor and chief of police of Melrose are making earnest efforts to lessen the automobile accidents in this city. A circular bearing the signature of these officials have been issued addressed to the automobile owners of that city. It reads as follows:

The city is making an earnest effort to prevent automobile accidents and to save our people from injury. We cannot at present increase the police force and I am asking all Melrose automobilists to help in this work, by cordial acceptance of all regulations, by willingly being inconvenienced by sustaining the officials and by creating a public sentiment in favor of more careful driving and higher regard for safety in the streets.

"It is impossible to accomplish much without the support of those who own and operate cars in this city. This appeal is made in behalf of our own people for whose safety some of us feel deeply responsible. Accidents fall heaviest upon those who have no part in their cause. it is an awful thing to bear the blame for a life long injury to someone else. In this city of law abiding people we ask everyone who drives a car to make every effort to make our streets safe."

BROCKTON, City Marshal Herbert Boyden has issued orders that hereafter automobilists operating at speed of 25 miles an hour or more be summoned intocourt whether the excessive speed is on Main street, West Elm street or Warren avenue.

GLOUCESTER. New speed limits. Every person operating a motor vehicle on any way in this city shall run it at a rate of speed at no time greater than is reasonable and proper, having regard to traffic and the use of the way and the safety of the public. It shall be prima facie evidence of a rate of speed greater than is reasonable and proper as aforesaid if a motor vehicle is operated on any way outside of the thickly settled or business part of the city at a rate of speed exceeding 20 miles an hour for the distance of a quarter of a mile.

It shall be prima facie evidence of a rate of speed greater than is reasonable and proper as aforesaid, if a motor vehicle is operated on any way inside the thickly settled or business part of the city at a rate of speed exceeding 15 miles an hour for the distance of one-eighth of a mile; or if a motor vehicle is operated on any one way at a rate of speed exceeding eight miles an hour where the operator's or chauffeur's view of the road traffic is obstructed either upon approaching an intersecting way or in traversing a crossing or intersection of ways or ingoing around a corner or a curb in a street or way.





New York's New Motor Laws Explained by Secretary of State Hugo



M OTORISTS in New York who have felt that the licensing act was simply a revenue producing measure will be interested in the following statement from Francis M. Hugo, secretary of state:

"The most radical step forward which New York has yet taken in the control of its motorists is to be found in the Cromwell-Kelly law providing for the licensing of operators. All persons who operate automobiles in New York city for more than 10 days in the calendar year are required to register with the secretary of state and pay a fee of \$1. Chauffeurs are licensed as herebefore. The minimum age limit for all licenses is placed at 18 years. Operator's licenses are required for all out-of-town drivers whose stay in New York lasts longer than 10 days. The practical effect of the new law is to require all of the owners of cars in New York City, as well as the members of their families over 18 years who sit at the wheel of the family car to be registered.

"A person may be summoned, upon 10 days notice, given a hearing and his license revoked for any physical or mental disability which renders him an unfit driver, for gross negligence in the operation of a car whereby a person or property is injured, and where he shows a reckless disregard for the life or property of others.

Headlight Law's Provisions.

The new headlight requirement which pursied a great many motorists at first are now understood by the majority of motorists, although a few drivers are somewhat confused and for their benefit Mr. Hugo writes:

No particular anti-glaring devices are to be officially approved by the state. The law confers no such authority on department or person. To comply with the new statute, however, automobile lights must meet the following requirements:

- 1. The beam of the reflected light shall not rise above 42 inches from the road bed at 75 feet ahead of the car.
- 2. The light from the lamp must be visible not less than 200 feet in the direction from which the motor vehicle is proceeding, and shall be of sufficient intensity to reveal objects straight shead for not less than 260 feet.
- 3. The front lights must give sufficient side illumination to reveal objects 10 feet to both sides of the car at a point 10 feet ahead of the lamp.
 - 4. Any auxiliary light or protecting

device (spotlight) is subject to the restrictions in regard to the beam. The beam of light is construed as meaning the approximately parallel focalized rays gathered and projected by a reflector, lens or other device.

Particular attention should be paid to ascertaining if the beam of the light rises above the prescribed 42 inches. On this largely depends the elimination of that dangerous glare that has forced many a driver into some roadside ditch.

NEW YORK STATE.

LE ROY. Automobilists passing through Le Roy, as well as the motorists of the village, will from now on be impelled to obey the traffic ordinances or be invited to visit the police justice and settle. The village trustees are to hire a special traffic officer whose entire duty it will be to enforce the law. The aldermen recently purchased a motorcycle fully equipped and the special officer will be mounted upon the machine.

WAVERLY. Waverly motorists are interested in the announcement that Owego village authorities are determined to enforce the new uniform traffic rules and regulations in that place. A short stay in enforcement was granted while George Shays, president of the Owego Automobile Club, has prepared signs warning motorists of the new provisions.

DUNKIRK. An ordinance to regulate speed and operation of electrically propelled trains and cars and of automobiles through and across certain highways within the corporate limits of the city of Dunkirk, N. Y.

The Common Council of the city of Dunkirk does hereby enact as follows:

Section 1. Every person or corporation operating or having control of the operation of an electric car or train running upon and along Railroad avenue, Doughty street, Lion street, East Fourth street and Central avenue to the City of Dunkirk, shall operate and propel such cars or trains in a careful and prudent manner and shall not operate and propel such cars or trains upon and along any of the aforementioned highways at a speed in excess of 12 miles per hour.

Section 2. Every person or corporation operating or having the control of the operation of an electric car or train running upon and along any of the highways mentioned in section one, shall not operate or propel such cars or trains across any street or highway intersecting the five aforementioned streets at a speed in excess of five miles per hour while such cars or trains are crossing said intersections.

Section 3. Every person or corporation

operating or having control of the operation of an electric car or train running upon and along Doughty street in said City of Dunkirk, shall cause every car or train running upon, along or through said street, to come to a complete stop in Doughty street prior to crossing the intersection of said Doughty street with Lincoln avenue, in said city, shall before said car is crossing said intersection.

Section 4. Every person operating any vehicle in the City of Dunkirk shall not cross Doughty street while proceeding in either direction upon Lincoln avenue at a speed in excess of five miles per hour.

Section 5. Every violation or the provisions of this ordinance shall be a misdemeanor, punishable as such,

LEGAL CONSTRUCTION OF NEW YORK AUTO LAW.

Many important phases of new laws in effect during the touring season are clearly defined by a statement from Melvin T. Bender, general counsel of the New York State Automobile Association, for the benefit of the members of the association and the motoring public as follows:

First—Amber headlights are not a violation of the law. This opinion of Mr. Bender's has been confirmed by Public Safety Commissioner Frost of Albany and instructions in accordance with these opinions have been issued to the Albany police.

Second—Signals need be sounded only at street intersections where the view of the driver is obstructed is the decision rendered by Justice Brady in Albany police court.

Third—Justice Brady has also decided that a first violation of the new traffic act is a misdemeanor and that police courts have jurisdiction in such cases notwithstanding the fact that the law does not specifically so state.

The question as to whether or not the uniform traffic law has eliminated speed ordinances outside of cities of the first class is now pending on appeal in Rensselear county in the Fitzgerald case.

NEW JERSEY'S LAWS.

New Jersey requires white lights on its cars and has declined to approve certain type of lenses in colors on the ground that it is impossible to distinguish between a light pointing out a dangerous street intersection or a grade crossing from those of an automobile.

New Jersey's Light Law.

The anti-glare headlight law is being strictly enforced in this state. State inspectors are patr_{DIII}:g the highways warning motorists who fail to obey the law with respect to having dimmers on their headlights.

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Some Graphic Items in and Around Motordom

The motorist in New York City, where they are the most numerous of any place in the world, has proven himself incorrigible beyond belief, so Magistrate House



of the traffic court has given his warning that no more leniency is to be shown the violators of the law. Traffic policemen have been warning motorists three times before bringing them into court for violations of the traffic law, but the magistrate, after fining one culprit \$75 and requesting that his license be taken away, stated that it was apparently useless to extend leniency.

A salesman arrested in Worcester for operating his car while under the influence of liquor pleaded with the court



for leniency on the ground that he had driven a car 65,000 miles and had never been brought before a court for improper driving or other cause. The judge, however, estimated that a bucking automobile could do as much damage at the end of a 65,000-mile trip as it could at any time during such a tour, and imposed a sentence of 30 days in jail on each of two complaints, the sentence to run concurrently. The salesman appealed his case and gave bail for appearance before the Superior Court.

In London, where gasoline is on a par with the price of a new straw hat and limited in supply at that figure, ingenious motorists have turned to operating their cars with illuminating gas, large air tight bags for holding the fumes



being attached to the tops of the machines. A sufficient supply can be carried to cover 30 to 50 miles. It proves quite a satisfactory fuel and costs less than gasoline when the latter is obtainable. As suggested by our artist, the gas could be utilized to furnish additional facilities on the car besides operating the motor.

Of the few present day unthroned kings that continue to rule with royal sway, none is no more firmly ensconced upon his throne than Ephraim Johnson, who is the chosen ruler of all the Gypsies. Outwardly none would suspect his royal strain, but yet his authority is absolute and he needs none of the royal trappings and jewels to maintain his position. He even rides about in one of



the modest cars, but his adoption of a democratic automobile as the royal carriage has not diminished his standing in the eyes of his subjects one bit.

The Delaware motor law has been recently amended to restore reciprocity to outside motorists, and, hereafter, tourists from other states and operators of commercial vehicles will not be compelled to take out a separate license in that state to use the highways.

Out in a western state the highway department is giving all motorists a free weigh while they wait. As each machine comes along over the highway it is

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stopped and the driver is requested to run his car with passengers upon a nearby scale. After the weight of the car and load is taken he is allowed to depart. This plan is used to determine the volume of traffic over the roads in that section.

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There are many places in the suburbs where the daily traffic on the roads is not sufficient to warrant the placing of traffic policemen at the dangerous crossings. On Sundays, when the riding is in large enough volume to call for such an officer, the town constabulary in these places is seldom so organized that one of its members can be placed on duty at the various cross roads within the town. This situation has been met in one of the

southern Rhode Island townships by calling for volunteers from the farms with the result that motorists are often surprised at the "make-up" of traffic cop



that gives them the stop and go signals.

The Chester County (Pa.) Automobile Club held a meeting at the farm of S. R. Dickey, Oxford, where over 600 members and their guests gathered to enjoy a collation and the speeches that were delivered by prominent Pennsylvanians. President A. P. Irwin of Chadds Ford presided at the meeting and introduced the following speakers: Thomas R. McDowell, Chester County Highway Commissioner; State Senator T. L. Eyre and



Rev. George H. Turner of Oxford. It was announced that the club had a membership of 700 and that the 1000 mark would be reached in the near future.

For many years as the motor car was coming into its own complaint was often heard from the owners of horse drawn vehicles that the new form of locomotion was a nuisance on the highways. Seldom, however, have we heard a wail from the motorist owing to his being inconvenienced in his liberties by the horse, although recently in a New England city an occasion for such complaint arose and it would probably have been registered had the owner of the machine which figured in the incident arrived on the scene in a hurry. An itinerant equestrian drove into the city square and noting the absence of a convenient hitching



post, drove over to the nearest motor car, tied the horse's bridle to the radiator cap and disappeared into the nearby refreshment parlor.

CURRENT VALUES IN THE USED CAR MARKET

Examples of Prices and Selling Points From Sales Houses in Eastern Cities Show Straightforward Handling of Big Trade Problem

CINCE the spreading of authentic information concerning used cars was taken up by The Automobile Journal in the spring numerous letters have been received from subscribers in which they have inquired for the identity and address of the people whose advertisements to sell cars have been reprinted in The Automobile Journal.

These advertisements were reprinted from New York, Boston and Providence papers, and so arranged as to show the wide range in the actual market value of the used car as substantiating proof that the propaganda to fix a schedule of prices for used cars was not only impracticable, but foolish. Having established the

point, advertisements of used cars from papers in the same cities are printed with the addresses of the sellers, showing clearly and authentically the actual market in used cars and enabling subscribers to locate any car in which they are interested.

A perusal of these advertisements will immediately convince one of the fact that the so-called used car problem does not appear in the light of a problem at all except as a legitimate business proposition, and it is also found that it is being handled very much the same as the new car business. Practically all the dealers give a guarantee to some extent. Some guarantee the tires for a time and

many will sell cars on time payments.

With sound business methods employed to market the used cars they are being removed as a dangerous element and the whole car market bettered. Much of the stigma that has depreciated the value of a used car has also been removed by the straight forward business dealings of most of the dealers. They usually advertise the price of the car, describe its condition and have available information regarding its former owners and the service it has been put to. In cases where no prices are given in the advertisements that information and other detail can usually be obtained by writing to the advertiser.

AUTOMOBILES

NEW YORK

ROSKAM-SCOTT CO. High Grade Used Cars.

1917 STUTZ Buildog Special; wire wheels.

1916 PACKARD Runabout; twin six; like

1916 CADILLAC Limo.-brougham; West-

inghouse shock absorbers.
1916 STUTZ Buildog Special; like new

1916 NATIONAL 12 cyl.; 6-pas. touring. 1917 COLE Tour.-Coupe; 4-passenger, 1915 PEUGEOT 5-pas; starting, etc. 1913 SIMPLEX 38; Springfield convertible.

1913 SIMPLEX 38; Springfield co Listed Cars For Sale. 1917 PIERCE 48; con.; new. 1916 CADILLAC Touring. 1917 HAL, new; town car. 1914 FIAT 20; town car. 1914 PIERCE 48; collapsible. 1914 PIERCE 48; convertible.

Demonstrations. Easy Payments ranged. Automobiles Traded. \$7000 AUSTRIAN DAIMLER "60" four senger; "Twin Six" PACKARDS, other PACKARDS, PIERCE-ARROWS, CADIL-PACKARDS, PIERCE-ARROYMENT PACKARDS, PIERCE-ARROYMENT PACKARDS, CRUMABOURS, Touring, Landaulets, etc.), \$250 to \$2600.

OLDSMOBILES ("Baby"). "Fours"
"Eights," \$600-\$750; SIMPLEXES, "38,"
"50," \$450 to \$1250; LIBERTY, \$740.

HUDSONS, 1915, 1916, 1917, Touring and Coupelettes, \$550 to \$1300, OVERLANDS, Coupelettes, \$65 \$175, \$225, \$250. other opportunities; daily arrivals. Bargains in Every Department.

JANDORF AUTOMOBILE CO., 203 to 307 W, 59th St. 1761, 1763 Broadway.

1917 BUICK Six Roadster; new; run only

1916 seven-passenger, six-cylinder BUICK, D 55; perfect condition.

1915 OLDSMOBILE, four-cylinder touring, model 43; perfect condition Time Payments Can Be Arranged.

AUTOMOBILE WAREHOUSE CO. 156 West 56th St. Money back if not as represented.

Brand new 1917 PULLMANS with electric

lights and self-stirters; guaranteed one year by manufacturer. Having purchased the 1917 factory output we will sell them at sacrifice. Time payments arranged. at sacrifice.

NEW AMSTERDAM AUTO CO. 221 West 37th 54.

AUTOMOBILES

1917 ROSS "8" Touring, \$850; elegant 7pos. touring; cannot be told from new.
1918 KISSELKAR; Victoria brougham;
beautiful town car; cost \$3250; cannot be
told from brand new; only used 8 months;
painted light Brewster green with cream
colored wheels; one of the classiest motor
cars in New York; has set of new Firestone non-skid tires, size \$2x4\frac{1}{2}; must be

cars in New York; has set of new Fire-stone non-skid tires, size \$2x\frac{1}{2}; must be seen to be appreciated; price \$1600. Beautiful 1916 COUPE; light 6; one of the classiest coupes in New York; seats four; chummy roadster style; beautifully fin-land interior; equipped with wire wheels; extra wire wheel and tire; cost \$3500; our price \$850; best bargain ever offered; must

be seen to be appreciated.

1916 PACKARD TWIN "8;" elegant sevenpassenger touring car; fully equipped with extras; set of slip covers; cannot be told

from new; submit offer.
1916 BABY OLDSMOBILE \$650; miles; appearance and mechanical condi-tion like a new car, MAXWELL CABRIOLET, \$375; almost new Cabriolet; mechanically perfect,

Time Payments.

Trades Considered.
NEW YORK MOTOR CAR EXCHANGE,
237 West 55th Street.

1915 and 1914 S. G. V. closed.

FIAT Racer Special. Packards, also Liberty Bonds Accepted in Payment.

AT LOWEST PRICES IN CITY.

BUICK "Light 6" sedan. STUDEBAKER "4" 3-pos Runabout.

1916 SANON 6-cyl., 5-pas 1916 OVERLAND 5-pas.

915 NATIONAL 6-cyl., 5-pss.

MERCER Runabout, PACKARD Berlin Limousine Body GOTHAM AUTO EXCHANGE, 1004 Broadway.

A MID-SUMMER SALE.

1917 DODGE 5-pas.

1917 CHANDLER Sedan.

1916 PACKARD Twin-6 Touring.

1916 HUDSON Super-6 Sedan, wire wheels.

LANCIA 5-pas.: wire wheels,
Many Others.
R. S. IRELAND, 1648-50 Broadway.

AUTOMOBILES

PIERCE-ARROWS; \$2000, while they last, will buy a rebuilt seven-passenger Pierce-Arrow touring car that will positively outwear any new car purchasable at twice as much. These cars are specially priced and canot be duplicated. Fitted with new one man tops, self-starter, electric light-ing and other very complete equipment. Guaranteed as we do new Pierce-Arrows.

ELLIS MOTOR CAR CO. 416 Central Ave., Newark, N. J. Plerce-Arrow Distributors.

Select Used Cars. Time Payments Arranged.

1916 MERCER Raceabout; perfect condition; special windshield and top: \$2200.
1914 MERCER five-passenger body: newly painted; mechanically perfect; \$900. STUTZ Bearcat; two-passenger; very fast; perfect shape; \$675.

R. C. GILHOOLY. 240 West 54th St. Basement.

PROVIDENCE

1916 OLDSMOBILE Touring; \$750; eight cylinders; all non-skid tires; had little mileage.

1916 OLDSMORILE Touring; \$650: four cylinders; 33x4 tires; just overhauled; 18 miles to gallon of gasoline.

1916 FORD Touring; \$250; crown fenders, rain vision windshield, 2 new tires; just

1915 BUICK Runabout; \$400; self-starter, electric lights, 32x3 1/2 tires, four cylinders, 1915 REO Touring: \$550; self-starter, electric lights, 34x4 tires, overhauled and painted; a roomy car and very economical car to operate.

1915 HUPMOBILE Runabout; \$500, in very good condition; \$1 ing; run 500 miles. \$150 *pent on overhaul-

1913 HUPMOBILE Runabout; \$250; self-starter; a dandy little runabout; all good tlres; \$350,

1914 FORD Runabout, \$190; excellent condition: every extra; m traded in for larger car. motor very quiet;

1913 HUDSON Touring; \$350; model 37, 4 cylinders; a beautiful car to operate; self-starter and electric lights.

W. MULRY. 97 Empire St., Providence.

AUTOMOBILES

the greatest force and variety of used and rebuilt cars ever concentrated in our used car department, which is open day and evening. Surely you can find the car to "just suit" you on display. These prices are our lowest; no discounts in lots; 1913 CADILLAC Touring car with starter and lights and extras at \$390.

1916 OLDSMOBILE "4" Touring car; a car that has had the best of care by female owner; was \$850; price now \$690; \$350 cash, balance easy.

STUDEBAKER Touring car at \$500.

COLE six-passenger Touring car in fine order; a snap at \$590.

NATIONAL four-passenger Sport car; cost \$2200; electric starter and lights; 2 new tires; rest of tires good; A 1 condition; new paint; purple with white wheels; a stunner; rebuilt; price down to \$1200, Guaranteed OVERLAND Touring

five-passenger; in fine condition; guaranteed to Jan. 1; \$350.

FORD Sedan in fine order.

1916 VELIE five-passenger Touring car; like new; be sure and see this one, you can buy it now for \$690.

FORD Touring cars; prices very low.

Extra snaps; prices cut from \$400 to \$500; BUICK Touring cars; several to select from; \$300 and up: BUICK Roadsters; five of these; \$250 and up; MARION Touring cars at secrifice prices: CADILLAC Touring car at \$250.

Three METZ Touring cars; if you are looking for the most for your money see these at our prices, \$250 up.

JEFFERY Touring car; five-passenger; electric lights and starter; a classy car at a bargain price; was \$750; now \$525.

STUTZ Roadsters, prices were \$850 to \$1000; if you are looking for speed now's your chance; prices for this sale \$550 up. SAXON Roadsters: \$150, \$250, \$326.

Model 83 rebuilt 1916 OVERLAND Touring a real family car that we guarantee until Jan, 1; \$500.

1915 KINO Touring car; five-passenger; like new; a big bargain at \$590.

R. C. H. Touring car; in good order; our bargain price \$200,

AMERICAN SCOUT: in good order; paint and tires good; sold under guarantee; our low price \$490.

Prices are constantly going up. Terms to reliable people. You will never have such a chance again. Demonstrations given of any oar we advertise.

PUGH BROS. CO. 53 Mathewson St., Providence, Fall River Branch, 532 South Main St.

We Have For Sale at 773 Broad Street.

1916 STEARNS-KNIGHT small 4-cylinder Rondster

1916 OVERLAND Touring car.

1914 CADILLAC Sedan.

1914 STUDEBAKER Little Six Sedan.

1915 CADILLAC Touring car. 1916 CADILLAC Touring car. 1914 CADILLAC Roadster.

We will take your old car in exchange. Time payments if desired.

CADILLAC AUTO CO. OF R. L. A. J. FELTHAM, Manager.

We are in need of room at our salesroom and will sacrifice what used cars we have on hand. Every used car marked down from 15 to 25 per cent.

1915 PORD Touring; excellent mechanical

rondition very reasonable.

CHRVROLET six-cylinder: mechanical condition perfect; newly painted and would make good family car; former price \$526; this week's price \$475; easily worth 1000

HOWARDS & LANPHEAR MOTOR CAR CO. 17-19 Snow St., Providence.

AUTOMOBILES

BOSTON

AUTO SALES COMPANY, 112, 114, 116, 118 Worcester St. Between Columbus Ave. and Tremont St.

Every attention is given to the mechanleal condition of the curs we purchase and for this reason we can guarantee every car we sell exactly as we represent it. The safe place to buy. Road these prices and save money.

and save money.

Easy Terms. Balance Monthly.

1916 BUICK \$675; touring car; run 3800 miles: little six model; just been thoroughly overhauled and looks and runs with all passes. like a new car; equipped with all new tires, spare rim and tire light and inex-

pensive to operate. 1915 OVERLAND \$425; model 80 roadsters; two to choose from; one equipped with four brand new Kelly Springfield tires; overhauled and revarnished this was the best model made by the Overland Co.; best model made by the Overland Co.: cost new \$1125; three months' guarantee. 1916 MAXWELL \$375; Touring car, with self-starter, electric lights; in the finest demountable rims, one extra; shock absorbers; call for demonstration.

1915 CHEVROLET \$325; Roadster, with electric lights and extra shoe; always been driven by original owner, who has just driven by original owner, who has just traded for touring car; has been newly varnished and looks like new.

1916 FORD \$310; Touring car; equip with many extras; 1917 style hood and equipped diator; Gray & Davis self-starter; electric lights all round; same size tires all round; two extra: shock absorbers; tire carrier; \$685; rare burgain.

1913 STUDEBAKER \$190; light five-passenger touring; 22 miles on a gallon of senger touring; 22 miles on a gallon of gasoline; equipped with every possible extra; four doors, demountable rims, one extra rim and new tire, four new tires on car; this is a rare bargain; fully guaranteed; call for demonstration.

1915 OVERLAND \$235; five-passenger Touring car; model 80, this was the best model built by the Overland Co.; self-starter, electric lights, tires and paint like new, casy riding quelities uncounsed; call

new, easy riding qualities unequaled; call for demonstration

1916 MAXWELL \$375; Roadster, with selfstarter, electric lights, in the finest possi-ble condition; tires and paint new; demountable rims; one extra; shock absorb-

mountable rims; one extra; snock absorbers; call for demonstration.

1917 CHEVROLET \$335; Touring, 4-90; used 1700 miles; self-starter, electric lights, absolutely like new; four new tires; this car was owned and driven by lady and has had extra good care; call for demonstration.

for demonstration.

1916 FORD \$265; Touring car; fully equipped; many extras; shock absorbers, crown fenders, demountable rims, same size tires all round, bumper on front car: has had very little mileage and is in fine condition.

1917 FORD town car \$465; used privately about 900 miles; fully equipped; many extras; shock absorbers; same size tires all

round; nobby tread; easy terms.

New 1917 FORDS; \$200 down, balance monthly; touring cars and roadsters; brand new; buy one of these cars now and pay for it as you use it; used Fords taken trade.

1914 METZ \$185; Runabout; that we took in trade for a small touring car; has been recently overhauled at Metz factory; a fine bargain.

New 1917 MAXWELLS; \$300 down, balance monthly; brand new touring cars; immediate delivery; finest equipment; self-starter and lighting system; order one of these cars now; delivery will be short.

FORD \$350; Touring car; used 100 s; fully equipped with extras; we this one in trade for larger car; miles: took this come quick

come quick 1916 SCRIPPS-BOOTH \$500; Roadster; used 1000 miles and absolutely like new; fully equipped; self-starter, electric lights, one spare tire and tube; call for

AUTOMOBILES

a demonstration of the car at any time. 1914 FORDS \$190; Roadsters; just been overhauled and painted; shock absorbers and silp covers; many extras, Bodies, Bodies; 190 FORD delivery bodies, 6-post, open and panel; new 1917 Ford touring and roadster bodies; 1915 Ford town car body \$50; 1916 Ford town car body \$50; 1916 Ford town car

town car body 400, 1000 body \$110. 1913 OVERLAND \$185; light five-passenger Touring car; in the finest possible condition; used by doctor and has had good cire; will demonstrate anywhere. We'll Arrange Terms to Suit You.

LANGHAM MOTOR CAR CO. 162 Columbus Avenue, New and Used Cars.

All late models, been thoroughly over-hauled and are guaranteed to be exactly as represented; don't miss seeing our cars before buying. Call for demonstration. Sold half down and balance monthly if desired.

1917 PACKARD 2-36 twin-six, sevensenger Touring car; with two extra tires and rims; size of tires 25 by 5; only been run 6000 miles and is absolutely like new: a scratch on the varnish; call for demonstration.

\$800; 1917 CHANDLER seven-passenger Touring car in excellent condition and is

fully equipped. \$300: 1917 MITCHELL Six Touring; gevenpassenger; in perfect condition and fully equipped

200; 1917 EMERSON Touring car; been driven less than 500 miles; this is a light cur; has self-starter, electric, and is very economical to run.
1917 FORD Roadster; has had very little

1917 FORD Roadster, maileage and is like new. \$800; 1917 STEARNS 3-cylinder Touring; condition seven-passenger; in excellent condition and is fully equipped; tires and paint like

\$750; CHANDLER Sedan; been thoroughly overhauled and newly painted and in in excellent condition.

\$385; 1916 MAXWELL Touring our; in perfect condition and fully equipped. \$425; 1916 CHEVROLET Baby Touring car; perfect condition.

1916 FORD Touring car; in good condition. \$650; 1912 PACKARD Limousine; seven-

passenger; in excellent condition; fully equipped. NATIONAL racy type Roadster:

thoroughly overhauled and newly painted; tires all good

\$1000; PIERCE-ARROW 6-88; landaulet; seven-passenger; with self-starter, elec-tric lights, new tires and is in the finest possible condition. 1750: S. G. V. Touring car; also landaulet

body car in perfect condition; tires and

paint perfect.
1915 HUDSON 6-40: seven-passenger Touring car in good condition; tires like new.
\$235; 1915 FORD Roadster; like new; has
had the very best of care.
\$135; 1915 METZ Speedster; in excellent
condition; tires and paint like new.

\$250; 1914 OAKLAND Six Touring; seven-passenger; in good condition; has self-starter and electric lights.

\$400: American Touring car: fully equipped.

MERCER Touring car; with wire wheels; one extra wheel and tire.

1917 STEARNS Limousine; 7-passenger cost \$3800; run fow hundred miles; will be sold at a sacrifice, 1916 STEARNS; 4-cylinder, 5-passenger

Touring car: \$750, 1915 JEFFERY: 6-cylinder, 7-passenger

Touring car: \$550.
1917 HUDSON Super Six Touring car \$950
1916 CADILLAC 8-cylinder Touring car

\$1050. 1917 BUICK Sedan; Little Six; \$1250, FRANK E. WING. N. E. Distributor Marmon Cars

562 Commonwealth Avenue.

AUTOMOBILES

1916 HUDSON Sedan Super Six model, "II

1917 CHALMERS five-passenger; very latest touring model; delivered 60 days ago and received part payment on a closed

CHALMERS 6-48; seven-passenger 1916 model; suitable for renting.

1916 SAXON Roadstor; four-cylinder; electric starting.

1914 CHALMERS Master Six; large tour-

ing model at a very low price.

If we have the car that suits you the price will be made of interest also. Phone, write, call about time payments. I old car taken in trade.
CHALMERS MOTOR CO. OF N. E.

420 Commonwealth Avenue, Boston,

AUTO CONSIGNMENT CO., INC. 601 Newbury St., Second Floor,

We Do Not Own a Car in the Place. We will give 10 months' time on any car in the house.

Three 1917 METZ cars; one practically

new and the other two slightly used.

1915 FORD Town car; in perfect condition; an ideal car for the renting man; easy terms on this car.

1916 STUDEBAKER: repainted, over-hauled; will make a real trade on this one, 1914 CADILLAC Touring car at a real bargain.

1917 DAVIS; 7-passenger touring car; this car has been used for very little demon-stration and will be sold at a large reduction, which must be within a very few

1917 MOLINE-KNIGHT, in excellent con-dition, this car is ordered sold this week for the high dollar; we have another one like it with wire wheels, in extra fine con-

1912 PACKARD Roadster; lights, overhauled and painted; three brand new tires; a real automobile at a real price.

1916 7-passenger CHANDLER; in perfect condition; owner says sell

2 1915 CASE Touring cars; extra fine condition; this is a real automobile.

1914 MAXWELL Touring car, in perfect condition and a real buy for little money; five nice tires; car to be sold immediately. 1914 CADILLAC Coupe, car ordered sold as the owner was caught in the draft; must be sold for the high dollar.

\$200, with the advent of our new 3-25 and 3-25 series twin sixes, we have a limited number of 1917 model 2-25 and 2-35 twin six demonstrators to offer; these cars have been operated by experts; further than that they have been put in the shop, overfurther than hauled and repainted and our New Car Guarantee goes with each one: the prices are at a liberal discount, on cars of other

are at a liberal discount, on cars of other makes we have cut prices to bedrock.

1915 WINTON six 7-passenger Touring car; mechanical condition excellent; just refinished; any one looking for a car of this make should see this one for \$800.

1915 CHALMERS Touring car; self-starter and alectric lights; margon finish with red

1915 CHALMERS Touring car; self-starter and electric lights; marcon finish with red wheels; a very desirable buy at \$200.
1915 REGAL 4-cylinder Touring car; presents a neat appearance, having been just repainted; this is a wonderful bargain and if you wish to take advantage of it it will be necessary for you to be here early Tuesday morning; \$300

1915 R-cylinder CADILLAC Touring car; with a roomy 7-passenger body; just re-painted; very powerful and easy riding;

1915 MITCHELL Touring car; painted dark blue; carries seven passengers; an easy riding car, which is in excellent con-dition, as indicated by its appearance; \$350.

PACKARD USED CAR DEPARTMENT. 1089 Commonwealth Avenue, Boston.

Providence, Worcester, Portland, Haver-hill, Manchester, New Bedford.

AUTOMOBILES

Dodge Brothers Touring cars: 1916 production; choice of a limited number from \$500 to \$615.

1916 STUDEBAKER Touring \$465; 7-passenger, 4-cylinder, electric lights and starter; numerous extras; choice of two. 1912 STUDEBAKER Runabout \$165; four good tires and one extra, hand horn. horn, good excellent mechanical speedometer and clock, tilted windshield. choice of two.

METZ Touring \$290; electric starter and lights; extra tire; excellent fluish; low mileage.

1916 CHALMERS Touring \$550, a light, amooth six 6-30; in fine shape throughout. HENSHAW MOTOR CO. 915-921 Boylston St., Boston.

\$500; 1914 CADILLAC Touring; this car is a bargain at this price; complete equipment.

\$550; 1915 CHALMERS Coupelet; a fine 3passenger car with complete equipment. \$700: 1915 CADILLAC 7-passenger touring; in good mechanical condition and has one spare tire. \$850; 1916 APPERSON 8-cylinder Chum-

my Roadster; this car is in excellent con-

BEACON MOTOR CAR CO. 660 Beacon St.

PARK SQUARE USED CAR CO. Motor Mart Building.

Three Months' Tire Service on All Cars.
1916 PACKARD Touring 35; excellent con. dition: run 5800 miles; excellent tires; car as good as new.

Latest 1917 PREMIER Touring, five or geven-passenger; 8-cylinder; like new; car

run 4600 miles. 1916 STUTZ Bulldog; wire wheels: two ex-tra; excellent condition; special paint job; car very fast.

All-weather car; 1917 HUPMOBILE Sedan; slightly used.

MAXWELL Cabriolet; all-weather Runabout: slightly used, 1912 DELAUNEY-BELLVILLE Limousine

five or seven-passenger; car built in France; good for 20 years' wear. 1913 WINTON; 7-passenger; all new tires,

self-starter and electric lights, lots of power; car been used private 1915 APPERSON; 6-cylinder Touring;

1915 APPERSON; 6-cylinder Touring; newly varnished; car guaranteed 1915 FIAT Touring; seven-passenger, with new self-storter and electric lights; car in wonderful shape

METROPOLITAN USED CAR CO.

16 Columbus Avenue, Boston. Your offer is invited on the following

MARMON: 7-passenger; model 34; wire wheels; just been varnished and looks like new; was left here for an offer; call and we will demonstrate; then use your own judgment.

CHALMERS Roadster; 1917 CHALMERS ROADSIET: run pupumiles; very economical and easy riding; just the car for salesman or small family; very roomy; see this and make an offer; will demonstrate any time.

will demonstrate any time.

PACKARD 1-35 twin six: 7-passenger; run
4000 miles; original tires and looks as
good as new; can be bought at a saving
of 3500; call early as this must be sold.
1917 MARION HANLEY: 6-cyl., 7-passenger; very powerful, substantial and well
built car; cost new \$1600; used very little; lots of extras; make wonderful touring car; call early; will demonstrate Cash if you have it. Terms if you want it.

Free service with used Overland 10 hours free service with partially overhauled Overlands from \$300 to \$500.
25 hours free service with overhauled Overlands from \$500 to \$800.

50 hours free service with rebuilt Over-lands from \$800 up. 1917 model 85-6 OVERLAND Touring; 5-

passenger; first one of these excellent light sixes on the market; good paint and tires

AUTOMOBILES

-one extra. Master carburetor, bumper and many extras; 17 miles on a gallon of

1916 model 75 B OVERLAND Touring; roomy, stylish appearing car; in A i condition; casy on tires and gasoline.

1916 WILLYS-KNIGHT Touring car;

dition; easy on tires and gasoline.

1916 WILLYS-KNIGHT Touring car;
equipped with the famous Knight silent
sleeve valve motor. This motor becomes
more quiet and powerful with every mile
of use. Carbon increases the power. There are some 80 less parts than the average poppet valve motor. Revarnished and driven but 5000 miles. FORD Touring \$225; excellent condition;

Master vibrator; shock absorbers and bumper

MERCER Touring oar \$650; model H-35; newly painted; tires in excellent condi-tion; two spare ones; very speedy and powerful

1916 OVERLAND SIX Touring car: 6-cvl., 45 horsepower, Continental motor. Seats seven people comfortably. Repainted a rich blue with gold stripe and cream colored wheels. Driven but little. Perfect

tires.
1915 OVERLAND Roadster; model \$1; a car you'll find very easy on tires and gasocar you'll find very easy on tires and gasoline because it's light and extremely easy
running. This type of car is rarely found
on sale—they're snapped up too quickly.
1913 OVERLAND Touring car; equipped
with U. S. L. starting and lighting system. Is in excellent shape. Good tires,
etc. A fine family car for little money,
1916 PULLMAN Touring \$425; CutlerHammer electric gear shift. Practically
new tires. Paint like new. Driven but
4500 miles. 4500 miles.

CONNELL & MCKONE CO. 533 Commonwealth Avenue, Boaton,

"Home of Low Prices." COLUMBUS MOTOR CO.

Al. Adams, Manager.
10 Columbus Avenue.
1917 AUBURN 6-43 3975; seven-passenger. divided front seats; a powerful car; a fine proposition for the renting business; just

like new.

1915 CADILLAC Touring \$695; seven-presenger; three and paint, also mechanical condition, just like new; make sure you see this

see this,
1914 HUPMOBILE \$375; Touring; electrically equipped; new shoes on rear; a very ecunomical and sporty four-passenger; lots of power.

MAXWELL Special \$200; has just come out of paint shop; demountable rims, a powerful and trustworthy car for the rough roads and hilly country.

SUPER-SIX Touring \$380; seven-passenger; has been driven by gentleman just 2200 miles; looks and runs like a new one 1914 APPERSON Touring \$390; a powerful car for the rough roads; has just been painted a beautiful blue with yellow painted a beautiful blue with yellow wheels.

BASCOM'S USED CARS. 33 Stanhope Street, Good Used Cars.

We will take any old car, large or small. in trade.

in trade. 6-cylinder KisselKar: 7-passenger: good paint, white wire wheels, electric lights and starter; \$500. 6-cylinder THOMAS; new paint: over-

6-cylinder hauled; \$350.
4 cylinder KISSELKAR; 5-passenger; \$350.

4-cylinder KISSELKAR: 0-passenger: starter and lights; big bargain; \$350. 6-48 PACKARD Limousine: 7-passenger: leather lined body; \$400. 6-48 LOCOMOBILE; 1911; good repair;

bargain: \$250.

1914 PIERCE "38" Touring \$1400; this per-1914 PIERCE "38" Touring \$1400; this perfect car is offered at this tremendous ascrifice owing to owner being obliged to realize some cash at once: electric self-starter and lights and five shoes practically new; must be seen to be appreciated 1917 APPERSON Chummy \$900; has had very little mileage and is in finest condition; seats four and is powerful, quiet running and easy riding; high grade, powerful. ning and easy riding; high grade, popular

AUTOMOBILES

AUTOMOBILES

AUTOMOBILES

car: inexpensive to operate; call for bar-

gain. 1916 HUPMOBILE \$650; Touring model; in finest condition; readily worth \$900, but will sacrifice for quick sale; owner must go away this week; thoroughly demonstrated to intending purchaser.

1917 STUDEBAKER Touring \$600; six-cyl-demonstrated to the same the same than t inder; just been thoroughly overhauled and repainted and looks like a new car; excellent light 6-cylinder car; suitable for

family or renting purposes.

1916 OVERLAND Touring \$400; model \$8; excellent condition throughout and original paint and shoes good; powerful, quiet running and easy riding; call for thorough

demonstration.

MAXWELL Runabout \$115; in finest running order and fully equipped; all good shoes and paint perfect; a fine light run-

about; inexpensive to operate and plenty

about; inexpensive to operate and pienty of power; call for bargain.

1917 CHANDLER Touring \$850; this popular, light family touring car seats seven and is in finest condition throughout; all good shoes and extra and motor is quiet running and powerful; call for thorough

running and powerful; call for thorough demonstration; guaranteed.

1917 OAKLAND Touring \$650; little six; in finest condition and fully equipped; original paint excellent and all good shoes; excellent power; climb any hill; call and see this one.

1915 BUICK Runabout \$400; model C 24;

been thoroughly overhauled and repainted and positively looks and runs like a new car; powerful and speedy; excellent trade

for doctor or salesman; call.

1917 HUDSON Super Limousine; used by private family only six months and can-

not be told from a new car; paint, tires, etc., perfect; an excellent family car or suitable for renting purposes; fully guar-

anteed and thoroughly demonstrated.

1917 BUICK Touring \$775; light six; model
4; brand new shoes and tubes and very
powerful and quiet running; call at once
for thorough demonstration of this fine, light touring our

1916 MAXWELL Runabout \$225; this fine, light runabout looks and runs like new; has all possible extras and is light, inex-

pensive to operate and very powerful; call for thorough demonstration. 1913 HUDSON Touring \$250; model 6-54; Delco electric self-starter and lights; all good shoes and car has been repainted and looks and runs like new; call,

GEORGE GROW. 221-328 Columbus Avenue, Boston.

TAPPING IVORY—A CITY GARAGEMAN'S GROAN

Demonstrating How the Dirregard of a Value ble Mechanical Tip Brings the Usual Lamentable Results to the Motorist

OU remember how Billy Sunday hit his hearers over the head with verbal hammers when he threw his oratorical clutch into high The city garage man smiled as the joyous memory surged through his jaded being and launched the odd question fair at the head of his sympathetic visitor. Involuntarily the latter, a tool salesman, winced a little as if expecting a blow above the ears himself. "Well," the garage man continued, "that is just about how hard some car owners must be struck to awaken them to the fact that a lack of mechanical sense is one of the motorist's greatest drawbacks.

"About 50 per cent, of them don't know the smallest thing about their car; they can't make minor repairs, nor can they make the little adjustments that are so



necessary for keeping the machine in satisfactory condition. If they only realized how little they know they surely would be more excusable; but they don't and one of the most aggravating ways that they take for proving their lack of knowledge is in their asking for advice. then going out and with total disregard for the good 'tip,' doing just what they want to.

"Take for instance Mr. Perkins, who is as good an example of an average car owner as I know. He feels able to cope with all of the ordinary forms of car ills and though he invariably asks me for advice, he seldom follows it.

"About a week ago Mr. Perkins came into the garage and asked what he could do to fix up the clutch on his car. The clutch is of the cone type, lined with



fabric, and the grease and dirt had accumulated until the facing had smoothed over. I was pretty busy at the time or 1 should have done the work myself; as it was I told him to give the fabric a kerosene bath, with a final treatment of neatsfoot oil. The kerosene would have dissolved the oil and grease and the resuit would have been a decent clutching surface. The neatsfoot oil would have softened the fabric and kept it in condition.

"Mr. Perkins listened carefully, with a knowing smile on his face, and then went away. He came back yesterday. There is his car! Look at that clutch! The facing looks as though it had been through a month's treatment on an emery wheel. It will take about four days to repair the car if I can find the time.

"What do you think he did? He had heard that Fuller's earth would solve the problem of a slipping clutch, and since this remedy was somewhat easier to apply than the one I recommended, he tried it. It didn't work quite as satisfactory as he had expected, so he tried a little sand, and I imagine, to judge from the appearance of the clutch, a number of other things.



"Some of the things that happen in this business are truly lamentable. If a competitor doesn't get hold of your best sale prospect, some friend grows ossified above his goggles and brings the grief in here. Look at my predicament!

"If I want to keep his business I must repair his car at a loss, as I sold it to him, and I want to keep him satisfied. Isn't it funny? When a man buys a car he seems to think that no matter what he does or how he uses the car the car should give perfect performance. He never blames himself for any trouble that he may have caused. Do I want any goods today? Well I have enough tools on hand to remedy any sort of car trouble that comes in here, but the overhaul of the car's master is always de



manding new equipment. If your house has a stock of Billy Sunday hammers. send me a dozen right away."

QUEBEC ABOLISHES THE CURBSTONE GAS PUMP.

The city engineer of the City of Quebec. following instructions from the by laws committee of the council, has ruled that no more gasoline pumps can be installed on the sidewalks at the curbing.

MONTREAL SHOW TO BE **HELD JAN, 19-26**

The annual show of the Montreal Automobile Trade Association will be held Jan. 19-26, 1918. Manager T. C. Kirby reports applications for 7000 square feet of floor space and the prospects point to a successful exhibition.









gested and am using heavy motorcycle oil. I am still troubled with excess carbon deposits in the cylinders, however, and a carbon knock develops at the end of about 700 miles. Is there any other remedy that you know of? I have a water vaporizer attachment, but cannot connect it anywhere but back of the butterfly valve. Do you think that the device would work satisfactorily if I did this?

With your equipment of leak proof rings and with the piston holes drilled as we recommended you should have little or no trouble with carbon.

Relative to oil in the system there are two extremes, either of which might result in trouble-too heavy oil or too light. Where the oil used is extremely heavy, it will accumulate upon the cylinder walls and in the piston ring grooves; in addition to this its extreme capillary action will result in the filling of the drain holes which you have drilled in the pistons. At every upward stroke of the piston a certain amount of the oil, will be forced upward, finally finding its way into the explosion chamber, where it carbonizes. Since your engine is of a different type from a motorcycle engine, the heavy carbonization of heavy oil is not blown from the cylinders as it would be in a motorcycle.

This heavy oil will deposit upon the rings and gum them

so that they do not function properly.

Oil that is too light will work by the rings into the explosion chamber and carbonize. We would suggest that you drain out all of the old oil, clean the engine thoroughly with kerosene and try a medium grade of oil.

Have you examined your valve setting? It is essential that the valves open to their maximum or the heavier products of combustion will not exhaust. While the engine is heated examine the clearance between the valve stems and valve lifters or tappets. This distance should not be more than the thickness of a business card and should be adjusted carefully.

It is hard to say just how the vaporizer would work if it were placed between the butterfly valve and the engine. It is probable that the results would be unsatisfactory, as the vacuum formed when the valve was closed would result in excess vapor in the cylinders. The engine would "load up" on water vapor. We suggest that you take this matter up with the vaporizer manufacturers and get their opinion.

INSTALLING ALUMINUM PISTONS. (A. N. S., Rochester, N. Y.)

I have a 1915 Chandler car and intend to overhaul the engine. At that time I should like to equip it with aluminum pistons if you will advise me as to whether you think the installation practical. What advantages do these pistons have over the cast iron type? What will be the approximate cost of the installation?

We give you herewith some of the advantages claimed for the aluminum piston as claimed by the makers of this type of pistons.

The average weight of an iron piston is approximately 31/2 pounds, and, working upon this basis let us assume that an engine running at a normal speed of 1000 revolutions per minute has six cylinders. At the end of every revolution the piston and connecting rod in each cylinder will have been stopped twice, or, in other words, the direction of its travel will have been reversed two times. As there are six cylinders, for every minute 42 pounds will have been accelerated to about 1000 feet per minute and stopped 1000 times.

To accomplish this one can see that an appreciable amount of power is necessary. Since the weight of the aluminum piston is only about half that of iron, the saving in power is noticeable. Not only is there a saving in power, but higher engine speeds are possible without the attendant strain that such speeds would bring upon the bearings of an iron piston

Quicker acceleration is another important point in favor of aluminum. This point, together with the minimizing of vibration, bring forward two big factors in favor of aluminum for racing cars.

The reciprocal action and its attendant pound upon the connecting rod and crankshaft bearings has a great effect,

Save Shoe Leather

Conserve America's Dwindling Supply, for Its Most Valuable Uses

THE world faces a leather famine. Tremendous demand and decreasing supply have caused an alarming scarcity. Sole leather has already sold for over a dollar a pound. Shoes have advanced from 50 per cent. to 100 per cent. and shoe manufacturers predict that, without quick relief, leather shoes of good grade will sell for \$15 to \$20 a pair.

The largest leather consuming industry is the shoe business. Automobile upholstery ranks next. Every automobile upholstered in leather takes leather enough to make 3 dozen pairs of shoes. Hence:

Motor car buyers must soon decide which they will do without-leather in shoes or leather in automobiles.

Du Pont Fabrikoid Motor Quality offers the best solution to the problem. More cars are now upholstered in it than in any other material.

Those automobile makers still using split leather acknowledge to us that it is inferior to Motor Quality Fabrikoid, but they hesitate to adopt the latter for fear some buyers may still think split (commonly sold as "genuine leather") is better. When buying an automobile tell the dealer you prefer one upholstered in Du Pont Fabrikoid Motor Quality. You will get a more serviceable-more lasting and more superior upholstery than split leather and you will do your share in the conservation of leather

Many cars are already upholstered in Du Pont Motor Quality Fabrikoid. You can get it on any car if you will ask for it.

Write for names of makers using it.



DU PONT FABRIKOID COMPANY

Wilmington, Del. Toronto, Canada

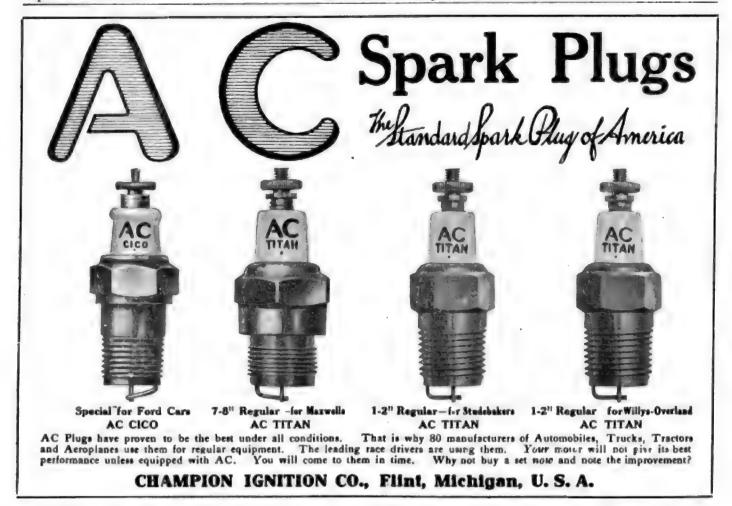
World's largest makers of leather substitutes

(When Writing to Advertisers, Please Mention The Automobile Journal.)









with absolute accuracy. These records are being added to daily by information received from the bearing manufacturers. There are, of course, other places where bearings may be obtained, but generally at these places they are sold merely "by the pound," as it were, technical information as to the proper bearing to use not being available. We render the buyer a distinct service, therefore, entirely aside from the mere act of selling.

"We maintain branches at the present time in 22 of the principal cities of the country. At each of these branches we carry in stock complete assortments of the three leading types of automobile bearings, Timken, Hyatt and New Departure. Our stocks include not only bearings of the type used in automobiles of present day manufacture, but of antiquated models and orphan cars as well. Our company being the sole service representative of the manufacturers mentioned above is naturally working in close co-operation with these manufacturers all of the time. In dealing with us, therefore, the dealer, garage man or motorist is practically dealing with the manufacturers themselves."

CRUISER MOTOR CAR COMPANY TO BUILD CAMPING AUTOMOBILE.

The Cruiser Motor Car Company, recently organized with \$250,000 capital, plans the erection of a plant to manufacture a new type of convertible touring camping car. The company was organized by men of Chicago, Ill., and Madison, Wis., and it was incorporated under the laws of Wisconsin. It is expected that the factory will be ready for occupancy in 90 days.

The car, which will have a self-contained camping outfit. has many novel features, although of standard mechanical construction. It will be known as the "Cruiser" and will sell for \$1185 or \$1250 with wire wheels. Both roadster and touring type will be produced. The models have been undergoing tests during the past year and it is reported that government officials are interested in them.

The officers of the company are: President, W. D. Curtis, Madison, Wis.; vice president and general manager, Win-

throp J. Burdick; secretary, Dwight S. Bobb; treasurer, George C. Riley, Madison; sales managers, C. A. Schimberg and E. J. Haines.

"AUTO SUGGESTION" THERMITE NUMBER.

The September issue of "Auto Suggestions," the house organ of the Northwestern Chemical Co., Marietta, O., opens the fall campaign on Thermite, the company's anti-freezing solution for radiators. The general sales manager, F. R. Hall, announces through its columns that the estimated output of 300,000 gallons of Thermite for the fall trade had already been sold and a second production of 100,000 gallons is under way to meet the increased demand.

EMPIRE AUTOMOBILE COMPANY.

The Empire Automobile Co., Indianapolis, Ind., completed its eighth year in business on Sept. 1 and in each succeeding year of that time has shown a steady growth. The company never attempted production on a big quantity scale, but has adhered closely to the policy of quality first and last in production, which has been responsible for its steady and healthy expansion.

Although the year just closed witnessed the largest production of Empire models ever attempted, the company enters the new year without a single model on hand or in the warehouses. Both the four and six-cylinder Empire models are steadily gaining in popularity.

BURKE WILL SELL EVER READY PRODUCTS.

W. W. Burke has been appointed sales manager of the American Ever Ready Works, Long Island City, N. Y., and will manage the distribution of the company's new starting and lighting system for Fords. Mr. Burke is one of the pioneers in the sale of starting and lighting equipment and was formerly eastern sales manager for Gray & Davis.

















LNDEX TO ADVERTISERS



EAGLEINE OILS

are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

These are the claims of thousands of motorists,—some with years of experience, who want full value, and more who know the value of high grade lubricants, and who know when they obtain satisfaction.

EAGLEINE QUALITY IS INSURED TO YOU

A grade for every type of motor. It is sold in sealed containers.

Let us send you our new book and chart. It is free at request.

EAGLE OIL AND SUPPLY CO. 44-45-46 India Street, Boston, Mass.

NEW YORK CITY Woolworth Building CHICAGO 1132 W. 37th Street

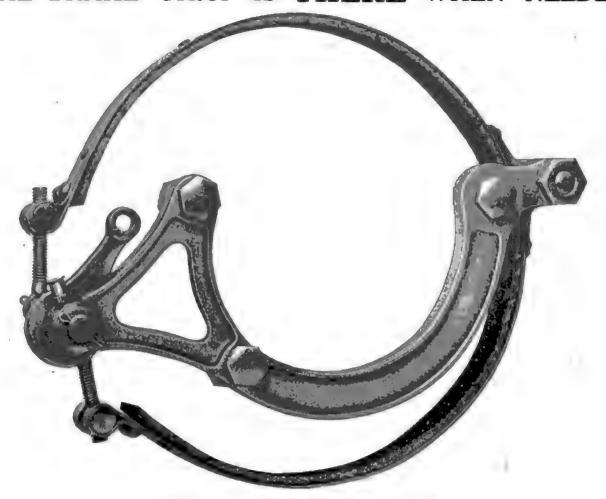
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Ford Size Tires
New 30x31/3 Non-Skid
\$7.50

Jandorf Automobile Company 1763 Broadway, New York



THE BRAKE THAT IS THERE WHEN NEEDED





The Perfect, Practical, Positive Brake For Ford Cars

HOLDFORD BRAKES are high-grade external contracting brakes for Ford cars, which can be easily and quickly installed to act from the hand lever as emergency brakes, or from the foot pedal as service brakes. Designed in accordance with the best engineering practice; the band and brace are of steel, the toggle crank and bracket are drop forgings and the lining J-M non-burn. Do not drag when released, no readjustment for wear is necessary and oiling is easy.

The brake usually supplied with this car cannot be depended upon in that "tight corner" or "on the hill." The hand brake wears out quickly and allows the car to creep when being cranked. The constant use of the foot brake quickly wears out the transmission. As the foot brake operates from the drive shaft any accident to the axle or the stripping of gears might mean a serious accident.

HOLDFORD BRAKES save wear and tear and will be attached by the wise owner on his pleasure car, delivery car or truck. They will positively stop a Ford with locked wheels on any grade, at any speed, with any load. Not necessary to remove old brakes. (When ordering state whether hand or foot brakes are wanted).

THE G. H. DYER COMPANY

Cambridge, Mass.





F URTHER exploitation of the service values to be found in new cars and used cars continues the aim of the Automobile Journal in the midst of conditions brought forward by the war. This magazine was the first and only publication to declare and prove repeatedly that a set price on a used car based on its model and year of manufacture is impossible of maintenance, as well as a detriment to every interest in the trade. The application of service principles in the handling of used cars is growing. Thus the automobile industry is making a real business of the used car business and not allowing it to drift and become more complex year after year. Money back clauses used with success in contracts on a resale guarantee that a car may be returned to the dealer within seven days from date of delivery and the purchase price be refunded provided that the car has not been in an accident, tampered with or misused, and is in as good condition as when delivered, except for ordinary wear and tear. Very few of the used cars thus sold come back, because the dealer has first made sure the car is right, the customer is inspired with confidence that it is right, and on trial it is found right.

T HE practicalities of the chasais conversion unit presents attractions to owners who are seeking use for the remaining values in their cars after they have served a period in the ordinary services as a passenger vehicle. This outlet for used cars, as followed up by many progressive dealers, proves not only a source of profit but promotes the sale of extra new cars. A very informative article on chassis conversion units leads this issue of the magazine as a contribution to the campaign of education designed to obtain proper recognition of the values of used cars.

NO. 4. SEPT. 25, 1917. TEN Chassis Conversion Units..... 9 Saving the Remaining Value in Thousands of Used Cars The Liberty Motor......14 Speedway Classics15 Chevrolet Wins Harkness Cup - Providence Races. Adjustment of the Studebaker. . 17 Used Car Overhaul of the Four and Six Cylinders. Fall Fashion Parade......20 By Mrs. A. Sherman Hitchcock. National Automobile Association.23 Review of 1917 Work in the Several Departments. National Highway Association..25 Good Roads Necessary for the Automobile. By Charles H. Davis. New Paige Body Designs.....27 A Trip to Lost River......28 Marvellous, Mystic Spot in New Hampshire Mountains, Accessories and Equipment....30 Ford Accessory Show......33 Garage IX......34 Plate of Brick Structure For Fleet of Private Cars. Used Car Quotations......36 General News of the Industry...38 Advertisers' Index 2 -:::-Tressurer . . WILLIAM H. BLACK Secretary . . . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

F a group of inventors and experts in mechanisms can pool their various talents and invent the very best aeroplane motor in the world, some other group of applied scientists should be able to develop an entirely practicable alcohol engine and thereby reduce the demand for gasoline. All motordom is interested in the Liberty motor for aeroplanes, announced as perfected at the very low total weight of one and threequarters pounds per horsepower. Next for solution is the subject of engine fuel. The adaptation of alcohol to this problem challenges American inventive genius. The matter is not a new one. The alcohol engine is a fact. But it has not received much attention. We have vast supplies of petroleum, but the enormous multiplication of automobiles and of stationary gas engines, would, without war or navies, create the need of supplementing a mineral resource which is capable of exhaustion. The war is likely to end next year, or, at the furthest, the year after, but the supplies of coal and mineral oil may become exhausted. The demand for motive power is always increasing, and increasing faster than the population. The material for alcohol for fuel can be produced in any quantity every year, not only from grain and vegetable crops, but the government itself has shown, according to reports of the Forest Products laboratories that it can be produced from sawdust. Fame, fortune and blessings of 4,000,000 motorists await the ingenious persons who can perfect the alcohol engine

OTHER features of this splendid early fall issue include timely and extensive fashion pages, superbly illustrated, a full account of the greatest speedway event of the year, the Sheepshead Bay handican and the used car overhaul of the Studebaker Four and Six.

1917 SALES

FOREIGN BUSINESS \$90,958,243.00

From National Automobile Chamber of Commerce, 7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Per Cent. Decrease in Shipments to Great Britain, France and Russia During Last Fiscal Year, Big Increases to All Other Countries—Shipments Total 80,811 Cara, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less—Fewer Trucks and More Passenger Cara.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917. the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analysing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased shipments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe.

Exports of commercial vehicles and passenger cars during the two years were as follows:

1916 1917

 No.
 Value
 No.
 Value

 Commercial....
 21,265
 \$56,805,548
 15,977
 \$42,337,315

 Passenger.....
 56,234
 40,660,263
 64,834
 48,620,928

Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14,468,233 less, the shipments of passenger cars increased by \$600 and their value by \$7,960,665.

Great Britain and France were still our largest markets, despite their heavy falling off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all trucks and amounted to \$14,691,460, as compared with \$19,137,904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries, Holiand and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries. Canada is America's best customer for motor cars, having increased her purchases by nearly \$4,200,000—from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647—an increase of \$1,248,735 over the year before.

The most remarkable increases, however, are shown by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took automobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States exported in the last fiscal year 23,435 automobile engines, valued at \$2,844,406; tires worth \$12,330,201 and parts worth \$27,284,932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

If you are a member of the Foreign Trade Bureau conducted by the Automobile Journal Publishing Company you can reach 8,000 foreign buyers of pleasure cars, trucks, fittings, supplies, accessories, tools and equipment in more than 81 foreign countries.

ALL FACTS AT REQUEST

Automobile Journal Publishing Company
TIMES BUILDING PAWTUCKET, R. I.













from nine to 12 feet is available back of the driver's seat. Used with a Ford chassis the wheelbase is 125 inches and the weight complete about 2100 pounds.

MISCELLANEOUS-Several other makes of serviceable conversion units manufactured in addition to those described include the following, concerning which the names and principal facts are given in the acompanying table:

, , , , , , , , , , , , , , , , , , , ,			
Name Maker			Price
Unity, Model AA. Unity Motor Truck Co., Cleveland, O	Bevel gear	1 ton	\$84.00
Unity Model A., Inity Motor Truck Co., Cleveland, O.	. Bevelgear	I ton	\$124.50
Unity, Model D Unity Motor Truck Co., Cleveland, O	Bevel gear	1 ton	\$147.50
Little Glant Con-			
vert-A-Car Chicago Pneumatic Tool Co., Chicago, Il	IL Chuin	1 ton	
Perfect Car Con-			
verter Convertible Equipment Co., New York.	Bevel gear	1250 lbs	\$125.00
" No. 2 Convertible Equipment Co., New York.	Bevel wear	1500 lbs.	\$135.00
" No. 3 Convertible Equipment Co., New York.	Bevel gear	1800 lbs.	\$145.00
" No. 4 Convertible Equipment Co., New York.	Hevel gear	Lton	\$175.00
No. 5 Convertible Equipment Co., New York.	Bevelgear	2500 lbs.	\$185.00
Aurora Simpson Mfg. Co., Downer's Grove, Ill	Chain	1 ton	\$350.00
Franklin Franklin Converter Co., Chicago, Ill	Chain	i ton	\$345.00
	- 1 1/22/03/03	W CCCII	4040.00
Stableford Equip- ment	Havel mean		250.00
ment	Int moves mean	l ton	\$275.00
No-Chain No-Chain Truck Unit Co., St. Louis, Mo	Int. gear		
Indestructible Indestructible Truck Co., Indianapolis, In	id. Chain	1 ton	\$350.00
Collath Commercial Car Co., Chicago, III	,, Chain	2000 lbs.	
Andaford Andaford Truck Co., Detroit, Mich	Chain	2500 lbs.	\$296.00
Additional Action Control of the Con			

The following addresses are also listed of makers of other truck forming attachments of the character treated in this article:

Ames Motor Car Co., Owensboro, Ky. American Manufacturing and Engineering

Co., Detroit, Mich.
Arnold Motor Car Co., 191-207 Paterson
St., Paterson, N. J.
Auburn Chassis Attachment Co., Auburn.

Commercial Car Unit Co., Philadelphia, Pa. Commercial Truckmobile Co., Chicago, Convertible Equipment Co., New Y York

City.
Evans Truck Mfg. Co., Detroit, Mich.
Globe Machinery and Supply Co., 205-11
West Court Ave., Des Moines, Ia.
Industrial Equipment Co., San Francisco,

Iowa Motor Truck Co., Ottumwa, Ia. Lewett Car Co., Newark, O. Kelley Convertible Auto Truck Co., Chi-

cago, Ill.
Lakeside Motor Truck Co., Chicago, Ill.
No-Chain Truck Unit Co., St. Louis, Mo.
Odeil One-Ton Truck Attachment Co., At-

Odell One-Ton Truck Attachment Co., Ac-lanta, Ga.
Phenix Truck Makers, Inc., 2887-9 South Michigan Ave., Chicago, Ill.
Pull-Ford Co., Quincy, Ill
Rayford Co., Philadelphis, Fa.
Robinson Machine Co., Detroit, Mich.

Simplex Truck Co., Chicago, Ili.
Stevenson Truck Attachment Co., East
Orange, N. J.
Union Truck Mfg. Co., New York City.
Woodward Truck Attachment Co., Los An-

geles, Cal. Wright Truck Attachment Co., Seattle.

The following are classified as adapter unit manufacturers:

Walter J. Forbes, Boston, Mass.; Hayes-Walter J. Forbes, Boston, Mass.; Hayes-Diefenderfer Co., Inc., New York City; La-conia Truck Co., Laconia, N. H.; Maremont Mfg. Co., Chicago, Ill.; Martin Rocking Fifth Wheel Co., Springfield, Mass., Motor Accessory Distributing Co., Boston, Mass.; Shadbolt Mfg. Co., Brooklyn, N. Y.; Xtend-a-Ford Co., Philadelphia, Pa.

SHOW MANAGERS WOULD EFFECT BIG SAVING IN COSTS.

The National Association of Automo bile Show Managers at a meeting held in Chicago recently made plans for co operating in securing the printing and decorative work necessary to stage their

annual shows as a means of effecting b.g. economies.

Managers were present from Boston. Albany, Providence, Cleveland, Milwaukee, Minneapolis, Kansas City and San Francisco. They decided on the co-operative plan whereby more claborate decorations can be secured at less cost than heretofore and the posters can be also obtained at an advantageous price.

JOHNSON HANDLES LEE TIRE IN NEW ENGLAND.

O. W. Johnson has been appointed manager of the new branch of the Lee Tire and Rubber Co., 1100 Boylston street. Boston, Mass., and will direct the distribution of Lee products in New England. George W. Bride, who has handled Lee tires for a long while, will continue as the Boston dealer.

Mr. Johnson was formerly representa tive of the Hartford Rubber Works at Buffalo, N. Y., and later represented the U. S. Tire Co. in that territory. He also represented the latter company in the middle west and southwest at one time

BOSTON CLOSED CAR WEEK.

The Boston automobile dealers will hold special closed car exhibitions in their salesrooms for a week, beginning Saturday, Oct. 6, and many of the distributors during that period will also show their entire line for the 1918 season, including all the models of open cars.

AMERICA'S OWN LIBERTY MOTOR

Engineers from the Automobile Industry Meet Emergency With Triumphant Success

MERICA has astounded the world with its phenomenal production of motor cars and her engineers' extablished reputations for quantity production that staggered those of the old world, but these accomplishments grew out of normal business conditions in peace times and no one knew what the United States motor car engineers would do when the call to meet an emergency was issued.

The answer was the Liberty motor. developed in little less than a month. built from parts made in 12 different factories stretching from Connecticut to California, and delivered in Washington and set running on Independence day as a warning that America was quick and capable of meeting all challenges against her independence.

A more wonderful feature of the Liberty motor, however, since foreign engineers have been developing aircraft motors for over three years under pressure, is that it is not an engine designed to fit an emergency, but one that has no peer in the world, is interchangeable to a degree heretofore never attempted and weighs less per brake horsepower than the best engines made in Europe.

The history of the Liberty motor is tersely and interestingly narrated in Secretary of War Baker's official report. made after the motor had passed all tests satisfactorily. After dwelling upon the circumstances that lead up to the creating of the motor the secretary said:

"Two of the best engineers in the country, who had never before seen each other, were brought together at Washington and the problem of producing an

all-American engine at the earliest possible moment was presented to them. Their first conference, on June 3, lasted from afternoon until 2:30 o'clock in the morn-

"These two engineers were figuratively locked in a room in a Washington hotel and charged with the development of an aeroplane motor for use by American aviators over the battlefields of Europe. For five days neither man left the suite of rooms engaged for them. Consulting engineers and draftsmen from various sections of the country were brought to Washington to assist them. The work in the drafting room proceeded continuously day and night. Each of the two engineers in immediate charge of motor development alternately worked a 24hour shift.

"The two engineers locked together in a hotel room in this city promised the government if given an opportunity they would design a satisfactory engine before a working model could come from Europe.

This story only summarizes the wonderful work that was accomplished by the engineers of the aircraft production board working with the U.S. Bureau of Standards and the War Department. Over a score of engineers cooperated in the work, but it is understood that the two men upon whom the bulk of the labors fell and to whom the most credit for the achievement is due are Major, Jesse G. Vincent and Major E. L. Hall.

The interchangeability of the Liberty motor is one of its most remarkable features and will make it possible to reconstruct new engines from mixed parts of wrecked eight or 12-cylinder motors.







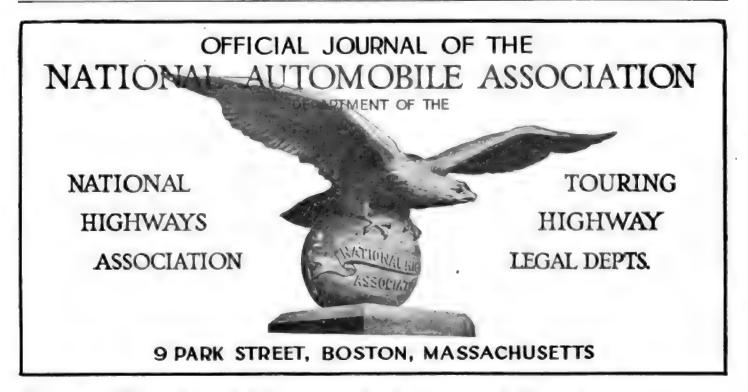












Some Work of National Automobile Association

Review of Valuable Services Rendered to Motorists in the Eight Months, January to August, This Year

N A recent issue of this journal special attention was called to the splendid educational work of the past few years of the National Highways Association in its gigantic campaign for national highways and good roads everywhere; and as the National Automobile Association is the Massachusetts division and one of the 126 divisions or departments of this great patriotic organization, it may be not without interest to

its many thousands of members and the readers of this journal as well; to have a slight idea of the valuable services rendered to motorists by the National Automobile Association for the first eight months of the present year.

The primary aim of the association is to render direct personal services to each member, and the fee of \$5 per annum is the only charge for all the benefits of the association.

MASSACHUSETTS.

We again call the attention of our members to the fact that the Massachusetts Highway Commission is by special inspectors arresting motorists who do not in some measure modify the dazzling headlights upon their automobiles. These inspectors are being stationed in the most unexpected localities, and we would, therefore, suggest that all motorists make some attempt to comply with the law. Massachusetts authorities have failed thus far to approve any dimming devices, although Connecticut and New York and some other of the eastern states have endeavored to enlighten a bewildered public.

CARS IN MASSACHUSETTS. There has been a gain of over 32 per cent. in motor car registrations in Massachusetts over the corresponding period of last year, namely, from January to August.

For the whole of 1916 there were registered 134,917 motor vehicles, including 18,194 commercial vehicles, as against 160,353 motor vehicles, including 24,025 commercial vehicles, for the first eight months of 1917.

The figures for 1916 and 1917 are as

1916	1917
Automobiles	160,353
Motorcycles 9,946	11,239
Manufacturers or dealers 1,914	2,335
Licenses (operator and chauffeur) 41,910	53,898
Operator and chauffeur	
renewals	109,672
Examinations 8,260	12,681

Including 16,756 commercial vehicles, 1916, Including 24,025 commercial vehicles, 1917.

Legal Department Handles 363 Cases

First in importance is the Legal Department. It consists of the general counsel and assistants at the head offices in Boston, in addition to many other attorneys located in various cities and towns in the New England states.

All members have to do if the emergency arises for immediate action is to consult the association's attorney nearest to him. If a member wishes legal advice as to his rights and liabilities he should communicate with the legal department at the head offices of the association and immediate attention will be given to these matters.

During the period above referred to the general counsel and assistants have handled 363 cases in the inferior and superior courts of Massachusetts, 172 of which were entirely successful, 211 cases partially successful and practically all of these were disposed of in a manner sat-

isfactory to the members. Through this service many hundred dollars have been saved for our members.

Local counsel in various cities and towns have taken care of 78 cases, 43 of which being disposed of favorably to each member

General counsel has received 735 requests for suggestions, advice and assistance from members dealing with legal matters, their rights and responsibilities. Four hundred and fifty of these requests related to accidents, 65 to repair bills, 31 to purchases of automobiles and the balance dealing with every conceivable kind of a subject in which an automobile or an operator was involved from the preparation of registration and licensing applications and local tax returns to the building of garages.

General counsel held 379 conferences with members relating to legal matters affecting them, their operators or their motor vehicles. Scores of matters of civil nature have been settled or adjusted between members and motorists in general outside of court.

General counsel and assistants have

participated in the discussion before the Legislature of Massachusetts on all bills—some 36 in number, affecting motorists and motor vehicles, and have also taken a great interest with local counsel in legislation in other states as well.

Touring Department, the Red Road Book

The association has distributed free to every member a copy of its celebrated Red Road Book, containing hundreds of detailed motor routes and new maps covering all of the New England and eight adjacent states. This tour book is one of the most valuable publications which the association has presented to its members.

In addition to these books 1456 special tours, covering all parts of the country and Canada, have been mapped out for members contemplating particular journeys.

One of the beautiful eagle emblems of the association has been distributed free to each member. This emblem, designed specially for the association by the late Bela L. Pratt, one of America's

leading sculptors at the time of his death, makes a most artistic ornament to any automobile.

The Automobile Journal, containing from 50 to 100 pages of un-to-date new and valuable articles dealing with every phase of motordom, has been sent free fortnightly to each member. The special editorial pages in this journal, devoted to some of the work of this association, have enabled members to keep fully, regularly and promptly informed regarding police activities, traps, new laws, regulations, traffic rules, roads under repair and detours, specially prepared and attractive motor tours, decisions, etc. In addition hundreds of our regular route cards, maps, etc., of the association have been distributed free to members.

Traps and Police Activities

Notes on Penalties Enforced for Transgression of Speed Laws, Non-Dimming of Headlights, etc.

MASSACHUSETTS.

Northampton. A trap is being operated to catch motorists who do not slow down and give a timely signal at the corner of King and Pleasant streets. Moreover, the police are generally enforcing the motor vehicle laws.

Rockland. An officer is watching for motorists at Mann's corner in this town.

This is on the road to Nantasket. Motorists are stopped irrespective of whether they are driving fast or slow.

Bridgewater. The police of this town are arresting motorists for failure to properly dim the headlights on their cars.

Boston. Columbia road. Many arrests are being made of overspeeding motorists on this boulevard.

Blue Hill avenue, at Mattapan. Metropolitan police are making many arrests in this vicinity not only for overspeeding, but for undimmed headlights and failure to sound horns.

East Boston. For failure to slow down and sound horns motorists in large numbers are being arrested at Saratoga and Austin streets. A trap is also being operated on Meridian street.

MAINE.

The new law of this state requiring the dimming of headlights is being very strictly enforced by the deputy sheriffs of various municipalities. Those officers now believe that they have been tolerant of ignorance and neglect long enough and will proceed against violators of other laws. They are convinced that

sufficient time has elapsed since the new law became operative for all motorists to equip their lights with dimmers or take such precautions to prevent blinding glare from their lights at night. We, therefore, suggest that motorists traveling in Maine take all necessary precautions to comply with the law requiring the dimming of headlights.

New York City. This city is now trying the "trap" system of checking motorists driving in various parts of the city
at an unreasonable rate of speed. The
"trap" consists of two traffic officers stationed two blocks apart, who take the
motorist's time with stop watches. One
of these "traps" has been set on Riverside Drive from 77th to 79th streets. If
these traps work well they will be operated during the day time all over the
city in place of motorcyclists and bicyclists patrolmen.

Silent Policemen.

Considerable complaint has reached us that many motorists disregard the instructions painted upon "Silent Policeman"—the wooden standards now placed at many street crossings in many of our cities. Many of these are erected by municipal ordinance and carry with them the force of law; some, however, are not set up by municipal regulation. However, we deem it best for convenience and safety that motorists should govern themselves according to the directions of these "Silent Policemen" and we "trust that all our members at least will do so.

New York Parks Delight Motorists

2.000,000 Acres of Forest Preserve Include Many Scenic Spots Accessible in a Car.

No section in the whole world can show more beautiful forest preserve than New York state. Not only does this commonwealth excel in wealth, population and good roads, but also in acreage in state owned forest preserve parks accessible to motorists and it is the established policy to constantly increase this, \$10,000,000 being recently appropriated for land and \$7,000,000 more for highway improvement. As early as 1825 it was discussed by Governor De Witt Clinton. The first appropriation, however, was secured in 1872.

The state's forest preserve today extends over 2,000,000 acres of wild lands, valued at over half a billion dollars. The Adirondack region covers over 1,600,000 acres. The Catskill preserve holds over 125,000. Both of these regions furnish recreation to hundreds of thousands of tourists and campers from all sections of the country, and are located within five hours from New York City.

One of the recent acquisitions to these two preserves was made in 1910, when the widow of the late Edward H. Harriman presented to the state some 10,000 acres of land situated in Orange and Rockland counties, bordering along the Hudson river. Also a sum of \$1,000,000 was given for the purpose of preserving this park and extending its development along the famous river. This is accessible to motorists from New York City over the Fort Lee-Bear Mountain trail. the finest specimen of highway engineering in the world.

In addition to the Harriman Park, the Palisades Park Commission, acting with a commission similarly organized from New Jersey, was created to preserve and protect the scenic beauty of the mountain lands on the west bank of the Hudson extending from Fort Lee up the river. Private contributions of land and money amounting to over half a million dollars, with more than that sum received from the State of New York and New Jersey, have assured the completion of the work.

The third great park, known as the Highland Park, consisting of the Harriman and Palisades parks, extends the scheme from Fort Lee up along the west side of the Hudson river as far as Newburg. Private subscriptions exceeding \$2,000,000 have been received from individuals to develop this work, while the State of New York has offered a considerable amount.

SEATTLE MOTOR TRAFFIC.

An official traffic census taken in 1915 at seven points in Seattle, Wash., showed 17,568 motor driven vehicles as compared with 5160 counted in the census of 1911, an increase of 222 per cent.



construct a system of highways extending over the entire country and embracing those routes which are now, or will come to be, through routes of travel, and interstate in character. A map has been presented after a long and painstaking study of the needs of all parts of the country, gathered by a most thorough correspondence and personal investiga-The routes follow either the best existing roads or lines where the best grades and alignment can be secured consistent with serving the greatest number of people. The entire length measures only 50,000 miles (a little over two per cent. of our present total mileage), and yet over 60 per cent. of our entire population is directly served by these routes-the whole country really served.

However, it is not supposed that this location is perfect in all respects, and is put forth merely as a tentative scheme, calculated to promote discussion and thus aid in a final determination. But whatever final location and mileage are fixed upon it is essential that they should be built, maintained and owned by the national government, under the direction of a national highway commission.

State Highway System.

Similarly each state should construct a secondary system of highways which would embrace all the main intercounty routes and bind together all portions of the state. These state highways should be built, maintained and controlled by the state, under the direction of a state highway commission.

County Road System.

Again each county should take care of a tertiary system of roads which would bind together all parts of the country and act as feeders to the state highways. These roads should be built, maintained and owned solely by the county.

Town or Township Roads.

After these county roads there would stili be left a few roads, purely local in character and generally with comparatively light traffic. These local roads, feeders to the county roads, should be taken care of by the town or township. Because of their light traffic-the heavy traffic roads having been taken over by nation, state and county-the cost of their construction and maintenance would not fall as a burden upon these local communities as it does under the present system, where such a large percentage, if not all of the roads, both through and local, have to be maintained by the local inhabitants.

The Result.

As a result of the fourfold system above outlined, there will be obtained a separate and distinct field of endeavor for national, state, county and township road officials; and, likewise, a certain definite object for national, state, county and township road appropriations. No one will encroach upon or be hampered by any of the others.

The automobile has thus far done more for the cause of good roads than any other agency. Should it not then give its unbounded support to national highways?

QUESTIONS OF SKIDDING LIABILITY

Massachusetts Decision Presents a Number of Interesting Points to Automobile Owners

Now that the season for skidding automobiles will soon be here again, it might not be amiss to present some of the views upon the subject of skidding by the Supreme Judicial Court of Massachusetts.

We find that in two actions recently decided, which were brought against a city to recover for the conscious suffering and death of the plaintiffs' interstate (hereafter cailed the plaintiff), alleged to have been caused by a defective condition of a highway, the evidence in these cases tended to show that the accident occurred in this manner:

The plaintiff, a milk man, was watering his horse at the fountain in the street between 8 and 9 o'clock on a misty morning, when an automobile carefully driven came upon the street, and by reason of the extremely slippery condition of its surface, due to oiling on the preceeding afternoon by those in charge of the defendant's streets, began to skid, could not be controlled and collided with the plaintiff's milk wagon, injuring the plaintiff, and from which injuries he subsequently died.

There was evidence also that the defendant failed in the performance of its statutory duty to maintain the way reasonably safe for travel and permitted to exist a defect consisting of extraordinary slipperiness, in the surface of the street. Mere smoothness and slipperiness of a sidewalk may be a defect. Oil spread upon the surface of the street, thus rendering it unreasonably slippery, is in no wise distinguishable, so far as concerns the legal principle involved, from the Hyatt lights in issue in these cases

Cities and towns, the court held, are not required by law to make special provisions in order to keep all their public ways at all times in condition for the safe passage of automobiles, bicycles and other mechanisms for travel newly devised and unthought of at the time when the statute imposing the general duty as to repairs of ways and liability for defects therein was enacted. But they are pledged to keep their ways reasonably safe and convenient for travel generally, having regard to all the circumstances. Automobilles are recognized by the law as a legal method of travel. Elaborate statutory provisions are made for their registration, for the licensing of those who operate them and for the management of them upon the public ways. It is common knowledge that at present in this commonwealth a larger number of people travel upon the highways in automobiles than in horse drawn vehicles. The care as to the repair of ways cast upon municipalities by the statutes has reference to all kinds of legitimate travel, including that rightly undertaken in automobiles. Although special provisions for their safety are not demanded their presence cannot be ignored.

There was ample evidence of the due care of the one driving the automobile which struck the plaintiff's wagon. The mere fact that the automobile skidded does not show negligence. If the conduct of the driver of the automobile was cautious, then his intervention between the defect and the injury would not as matter of law break the direct casual connection between the injury to the plaintiff and the failure of duty on the part of the defendant.

And the court further states that the fact that the oil was spread upon a street under the direction of the defendant's superintendent of streets was important chiefly upon the question of reasonable notice to the defendant of the existence of the defect. It was of no consequence whether the defendant was responsible for his negligence or not. The liability of the defendant is found on its failure to keep its streets reasonably safe for travel and to remedy a defect likely to be dangerous.

That might be found to exist quite independent of its liability for negligence of its superintendent of streets. If the rain of the night intervened between the oiling of the street and the accident was a factor which created the danger, then it might have been found that the rain should have been guarded against by warning, sanding or otherwise.

Road Conditions

The following notes are taken from late reports received by this department regarding highway conditions in states designated.

NEW YORK HIGHWAYS.

Ulster County, N. Y. The Kingston road running from Kingston to Ashokan boulevard, which has been under construction for some time, is now completed and open to the public.

NEW JERSEY HIGHWAYS.

The Highway Commission of New Jersey is now directing that all freshly oiled highways in the state be immediately sprinkled with sand.

MASSACHUSETTS HIGH-WAYS.

The highway between Pittsfield, Mass., and Albany, N. Y., is in splendid condition with the exception of one bad detour.

From Shelburne Falls to Greenfield the road is in very good condition.

From Pittsfield to Shaffield, Jacob's Ladder, the road is in good condition, notwithstanding the enormous traffic along this attractive highway.

On the main highway between Boston and Worcester there is a bad stretch at Shrewsbury.















THE USED CAR MARKET STRONGER

Current Values Proclaim a Powerful Absorption of Vehicles as the War Affects Conditions

THE used car market in New England and New York City shows a much stronger tone than during the preceding month, despite the fact that the season is approaching when the largest number of motorists abandon their touring until spring. At this time in previous years the offerings of used cars have always been the heaviest, but this year there are many influences at work which have been responsible for the failure of this rule to work.

Thousands of used cars are being converted into commercial vehicles with the truck forming attachments and all indications point to an even greater movement in this direction, as there is a deep-seated belief that the truck makers. swamped with government and foreign orders, will not be able to cope with the demand. The general advance in the price of new passenger cars has also been a powerful factor in deterring owners from disposing of their old cars as in Many manufacturers have past years. emphasized the possibilities of a passenger car shortage owing to the demands for materials for war work, and it is only natural to expect that the tendency will be in this direction if the war continues long, as it has so developed in England and France.

While not a tangible factor, to which the demand can be traced directly, the fact of general and unprecedented prosperity throughout the country is probably the real basis of the strength in the second hand car market. In most states the registration figures for the first six months of the year were equal to the entire registration for 1916, showing that while a year ago the statisticians were figuring to show the point of saturation, individual wealth has been so greatly enhanced that cars are today sold to people who a year ago, yes, six months ago. were not included among possible prospects. If business is maintained at its present enormous volume the limit of sales is indeterminable. Examples from the used car columns of the public prints are given herewith:

NEW YORK.

1917 REO SEDAN, 1917 ROSS "B" TOURING, \$850. BRAND NEW SCRIPPS-BOOTH COUPE; big discount. BRAND NEW SCRIPPS-BOOTH ROAD-RTER; big discount.

1917 OVERLAND COUNTRY CLUB. Like 1917 MITCHELL TOURING. 1916 MERCER RUNABOUT 1916 MERCER RUNABOUT,
1916 FRANKLIN LIMOUSINE,
1916 CHALMERS, \$825.
1916 KISSELKAR: Victoria brougham,
1916 HUDSON CABRIOLET
1916 BUICK LITTLE "6,"
3RRIES "17" STUDEBAKER, 6 cylinder,
1916 CADILLAC "8,"

1917 MARMON CHUMMY ROADSTER.

1917 SINGER TOURING.

1916 CADILLAC "8."
1916 DODGE TOURING, \$525
Time Payments Arranged,
Trades Considered.

NEW YORK MOTOR CAR EXCHANGE, 237 West 55th St.

1917 STUTZ BULLDOG SPECIAL 1917 HUDSON SPECIAL RACEABOUT. 1917 PAIGE SEDAN.

1917 LIBERTY TOWN CAR, SCHOONMAKER & JACOD. 1700 Broadway.

RENAULT SPECIAL BOAT ROADSTER; RENAULT SPECIAL BOAT INCLED RELATION.

[atest importation.
CADILLAC 1917 SEDAN; wire wheels.

STUTZ 1916 BEARCAT; wire wheels.

S. G. V 1915 FLEETWOOD ROADSTER.

MARMON 1916 CLOVERLEAF

BURRELLE.

Conner 54th

1704 Broadway, Corner 54th.

At Lowest Prices In City. WINTON LIMOUSINE, run 5000 miles; like new.

miles: like new.
1917 CADILLAC TOURING: 7-passenger:
#lip covers, bumper: run 1200 miles.
1916 STUDEBAKER: excellent condition.
1916 REO TOURING: 5-passenger.

1916 BUICK RUNABOUT.

1915 PACKARD 3-38 TOURING; 7-massenger. 1914 PIERCE-ARROW, overhauled and painted Brewster blue, 1913 MERCER RUNABOUT; Bosch starter and lighting system. 1912 MERCER SPEEDSTER. GOTHAM AUTO EXCHANGE. 1694 Broadway.

COLE 1916 8-cylinder, 7-passenger touring

COLE 1916 Big Six, 7-passenger touring car; Westinghouse shock absorbers; new-

car; Westinghouse and a ly painted.

COLE 1915 5-50, 7-passenger touring car; newly painted.

The above cars are all equipped with modern improvements, are all in good operating condition and the prices are reasonable. The cars are worthy of examination was will accept your present car in sonable. The cars are wortny or cardination. We will accept your present car in

COLT-STRATTON CO, USED CAR DEPT. 1764 Broadway, at 57th St.

PACKARD AUTO EXCHANGE 10 West 60th St.
(Two Doors from Broadway.)
PACKARDS.
1917 "2-25" Clover Leaf, 4 passenger,
1916 "1-25" touring, 5 and 7-passenger,
1915 "3-38" touring, 7-passenger,
1915 "3-38" touring, 7-passenger,

1912 "30"-"48" touring and landaulet oef A

1915 STUTZ RUNABOUT.
1916 and 1914 S. G. V. closed.
1914 FIAT touring, 6-passenger.
FIAT racers, special.
Liberty Bonda Accepted in Payment.

ATTENTION, CONSERVATIVE BUYER
1917 BUTCK "Ittle 6" touring, like new.
1916 HUDSON Sedan, perfect condition.
1916 PACKARD twin 6 town car.
1916 DODGE Touring, 6-passenger.
1016 Conservation of touring, wi CONSERVATIVE BUYERS LANCIA G-passenger touring. wheels.

R. S. IRELAND. 1648 Broadway. Phone Circle 3249. 1917 PACKARD; chummy roadster.
1917 STUTZ; bulldog; special; wire wheels. 1913 PIERCE; 38 landaulet. RENAULT; six-cylinder; late limousiae. PIERCE 66; Brewster landaulet. 1914 ISOTTA; latest 20; town car. 1913 LANCIA; latest 20; town car.
1913 LANCIA; 30 touring.
1917 CADILLAC; limousine.
1914 PIERCE; 38; limousine.
1914 PIERCE; 38; 5-passenger.
SIMPLEX; 38; Springfield body.
1914 MERCEDES; 25; limousine-brougham. RENAULT: 14-20; limousine-brougham

> ROSKAM SCOTT 1896 Broadway (63d).

BOSTON.

1915 JEFFERY Touring, \$350; electric self-starter and lights and in the finest possible mechanical condition; all fine shoes and original paint is perfect; call at once for bargain.

1917 MITCHELL Touring, \$775, has had very little mileage and excellent care and looks and runs like a new car; all fine shoes and original paint perfect; call for fine trade.

1916 DODGE Runabout, \$525; this popular light runabout is an exceptional trade, as it has always been used by a young lady

and only driven few hundred miles; fully guaranteed; call at once.

1916 MAXWELL Touring, \$325, has had very little mileage and excellent care and looks and runs like a new car; all fine shoes and paint is new; call for fine light

1917 VELIE CABRIOLET, \$850; cost \$1606only run 1200 miles by owner, who sailed for France Saturday; this is a perfect car and is the positive reason for tremendous

1916 CHALMERS Touring, \$475; model 40: thoroughly overhauled and repainted and in finest condition throughout; seats 7: suitable for family use or renting pur-

1914 PACKARD Limousine, \$900; has just been thoroughly overhauled and repainted

been thoroughly overnaticed and repairing and is in finest condition throughout; has always ben used private and had excellent care; call for bargain.

1916 OVERLAND Touring, \$275; like new throughout; always used by elderly couple, who only run it Sundays and holidays; tires, paint, etc., perfect; guaranteed.

1915 VELIE, 5-passenger, \$300; Gray & Davis electric self-starter and lights and in finest condition throughout; cost \$1800 and is a powerful, easy riding family tour. ing car

1916 BUICK RUNABOUT, \$600: light six 1916 BUICK RUNABOUT, \$600: light six model; mechanically perfect; inexpensive to operate and very powerful; 5 good shoes and paint excellent: climb any hill and runs quiet; guaranteed 1916 PULLMAN Touring, \$350; this fine light touring car has electric self-starter and lights; all practically new shoes and is in finest mechanical condition; original paint perfect.

paint perfect.

STEARNS Coupe, \$900; late model; cost \$4500 and sents 4; a fine high sprade, all-year-round car that is readily worth \$2000 now; don't miss this one.

now; don't miss this one.

1917 SANON Touring, \$550; this fine light six-cylinder car is practically new and is only offered at this low price to insure immediate sale; fully guaranteed and demonstrated.

1916 CHEVROLET Runabout, \$40: Royal Mail model; just been thoroughy over-hauled and repainted and has all brand shoes; a fine light runabout; inexpenalve to operate.

1915 BUICK TOURING, \$450; model C-27; cost new \$1385 and has every possible ex-tra; all good shoes and original paint; is in excellent condition; powerful, speedy and quiet running; call for bargain.
1917 STUDEBAKER Touring, \$550; 6-cgf-Inder.

> GEORGE GROW. 321-323 Columbus Ave., Boston.

1916 MERCER Touring: 2272 6-p/ssenger:
new cord tires; newly varnished; car used
in all 6500 miles; practically new.
1916 FIAT Touring; new body, self-starter
and electric lights, small motor, very rerhable and fast; look this car over.
All-Weather car complete: 1917 HUPMOBILE Sedan; excellent family all-weather
mar: newly varnished; car guaranteed.
1916 REGAL Touring; refinished extra
small touring; very fast.
1917 OLDSMOBILE; 8-cylinder touring;
very snappy; car perfect.
Series 1918 MAXWELL Touring; nearly
new. 1916 MERCER Touring; 2272 6-p://ssenger 1917 MAXWELL Touring; used 3000 miles; looks and rides like new. 1917 ENGER Touring; twin six; nearly a new car; ractory guarantee.
All-Weather Runabout; 1914 CADILLAC Coupe; had the best of care; used by private family with chauffeur; car guaranfactory guarantee. new car: tend. All-Weather Car: 1917 CADILLAC: Brougham; used 500 miles: guaranteed; chance for high grade car. PARK SQUARE USED CAR CO. 13 Columbus Ave., Motor Mart Bidg.

1917 HUDSON Super Six limousine; in excellent condition, \$800-1917 MITCHELL, Touring; seven-Dasenger \$800-1917 DAVIS Six Chummy Roadster; only been driven 1200 miles. \$1250-1916 HUDSON Super 6 Sedan; in the finest possible condition; has two extra tires and rims. \$550-1916 OVERLAND: Willys-Knight Roadster with slip cover on seats and many extras. \$800—Special built racing car; 85 miles an hour; has wire wheels and is fully -quipped \$400-1916 PULLMAN; chummy roadster; excellent condition and fully equipped. \$550--1916 OLDSMOBILE Roadster; in A 1 condition. \$400-NATIONAL Racy Type Roadster; 3406—NATIONAL Racy Type Roadster; overhauled and newly painted. 3450—CLEMENT-BAYARD; six-cylinder touring; shaft drive; cost \$7000 new. \$275—1915 FORD Town Car; in good con-METZ Racy Type Roadster; good condition. \$285-Three 1916 FORD Touring cars; in good condition. \$300-1916 FORD Delivery; panel top body. \$485-STUTZ Touring car; in A 1 condi-tion and fully equipped. \$250-1915 FORD Touring; with many ex-\$285—1913 CHALMERS Limousine; seven-passenger, in A 1 condition and fully equipped; excellent renting car.

1914 FORD Touring; with a 1916 body; in excellent condition; has many extras.

\$225—1914 OAKLAND Six Touring; seven-passenger; in good condition.

Winter Top for a 1916 Dodge Roadster, Winter Top for a 1916 Hupmobile Roadster, Coupe Body for a Cadillac, sedan, limousine and delivery bodies.

LANGHAM MOTOR CAR CO.

162 Columbus Ave. \$285-1913 CHALMERS Limousine; seven-

Model 34 MARMON; 7-passenger, in the finest possible condition; one of the "easiest riding cars in the world;" can be bought at a sacrifice; owner must dispose of; call early for demonstration.

1916 STUTZ Buildog; 4-passenger, painted red, with red upholstery, very sporty, fast and powerful; this car should be seen to appreciate a real bargain; call for ride. and powerius; this car should be seen to appreciate a real bargain; call for ride.

1917 VELIE: 7-passenger; divided front seats; very roomy; run less than 5000 miles; cannot be told from new; cost \$1950; will sacrifice for almost half price; fully guaranteed. 1917 CHANDLER; 7-passenger; practically new tires; motor in very good condition; needs coat of varnish; can be bought new tires; motor in very good condition; needs coat of varnish; can be bought cheap; call for demonstration. 1917 KING "8:" 7-passenger; run 4000 miles; very smooth and powerful; looks fine; fully guaranteed and will demon-strate anywhere.



RACING CONTESTS.

Danbury, Conn., track race.....Oct. 6 Uniontown, Pa., speedway race....Oct. 6 Chicago, III., master drivers. . Oct. 11-12-13 Richmond, Va., track race.....Oct. 13 Chicago, III., speedway race.....Oct. 13 New York, speedway race.....Oct. 27 Columbus, O., Dixie tour.....Oct. 24

SHOW CALENDER.

Buffalo, N. Y., closed car show. Oct. 1-6 Boston, Mass., closed car show. . Oct. 6-13

1917 CHALMERS; 6-30 Touring; very powerful; 3400 revolutions a minute motor; just the car for an economical family; cannot be told from new; call and be convinced.

1916 MAXWELL Roadster: run less than 4000 miles; in elegant condition; you can save about \$200 to \$300 on this car by see-ing it early; call and we will demonstrate anywhere,

1916 BUICK "Big Six;" 7-passenger; in first class condition; now being revarnished; if you want power, speed and comfort combined, see this early; good tires and guaranteed thoroughly.

1913 FIAT; 5-passenger; slip covers and in perfect condition; looks like new; fully equipped and guaranteed; can be bought at your own price.

at your own price.

1914 CADILLAC: 7-passenger; Mr. Renting Man here's the car you want; in fine mechanical condition; cannot be better; newly painted and first class tires; call early and be convinced as to a good buy.

1913 MAXWELL Special: 5-passenger; must be sold before Tuesday; make offer; whether for junk or pleasure driving; see this and make an offer. this and make an offer.

LYONS-KNIGHT Racer: seats; looks good; will sell for practically junk price; call and make an offer.

METROPOLITAN USED CAR CO. 16 Columbus Ave.

PROVIDENCE.

1913 CADILLAC Touring Car with starter

and lights and extras at \$390.

1916 OLDSMOBILE "4" Touring Car; a car that has had the best of care by female owner; was \$850; price now \$680; \$350 cash; balance easy.

STUDEBAKER Touring Car; a bargain at \$450; this car is worth considerable more 3450; this car is worth considerable more than we are asking.
STUDEBAKER Touring Car at \$500.
COLE 6-passenger Touring Car; in fine order; a snap at 3590.
1916 BRISCOE Touring Car; new paint, good tires; just the car for salesmen; was \$475; now \$330. We now have a DODGE Touring Car in fine condition; price low. FORD Touring Cara; prices very low. Extra Snaps; prices cut from \$400 to \$500; BUICK Roadsters; five of these; \$250 and MARION Touring Cars at sacrifice prices. CADILLAC Touring Cars. If you are looking for the most for your money see these at our prices; \$250 up. STUTZ Runabout; electric starter and lights; slight repairs will make it as good

as new; \$650, SAXON Roadsters; \$150, \$250, \$325.

Model 83 rebuilt 1916 OVERLAND Touring Car; a real family car that we guarantee until Jan. 1; \$500.

sonable price. FORD Touring Body; a bargain. FORD 1917 Runabout Body; used very lit-FORD Touring; has had very good care: looks good and runs well; a good family car; terms on all the above cars. EDWARDS & LANPHEAR. 17-19 Snow St. At 773 Broad St. WHITE small 4-cylinder Roadster; electric lights and starter; very fine condition; 8475 1915 DODGE BROS. Touring, \$475 1916 DODGE BROS, Touring, \$550. MITCHELL Roadster; very fine condition; \$500. 648 PIERCE-ARROW Limousine. 1913

Westinghouse shock absorbers; best of condition; \$1500.

1916 COLE, 7-passenger touring; wire wheels; exceptionally good condition;

OLDSMOBILE 8-cylinder Sedan: 1917 \$1450.

Also several others from \$100 to \$2000. We will take your old car in exchange. Time payments if desired,

CADILLAC AUTO CO. OF R. I

.....Jan. 26-Feb. 2 Boston, Mass., Boston Automobile Dealers' Association show, Mechan-

Chicago, III., national automobile show

1915 KING Touring Car, 5-passeager, like new; a big bargain at \$590. R. C. H. Touring Car; in good order; our bargain price \$200, SMITH FORM-A-TRUCK; run less than

two months; a snap at our price.

PUGH BROS CO. 53 Mathewson St.

1917 BUICK Touring; little 4-cylinder; run 2000 miles; a new car; in Thursday. 1916 COLE Touring; 8-cylinder, 7-passen-ger; motor very quiet; a beautiful riding Car 1916 OLDSMOBILE Touring; 8-cylinder, a light and roomy car: 33x4 tires.

1916 OLDSMOBILE Touring; 4-cylinder: a very light car, with plenty of power: 18 miles to a gallon.

1913 HUPMOBILE Runabout; self-starter and electric lights; 33x4 tires; \$350.
1915 REO Touring; a light touring car

a lot of power; overhauled and painted. vision windshield; in perfect shape.

1918 HUDSON Touring; model 37; self-

starter and electric lights. WILLIAM MULRY.

98 Empire St.

PLATE IX

BRICK GARAGE PLANNED FOR A LARGE HOUSE

Commodious Structure With Model Features in Its Door Equipments, Chauffeur's Quarters and General Conveniences

Designed by the Architectural Department of the Automobile Journal Publishing Co.

THE garage herewith shown is designed for brick construction and has been laid out with areas for two large cars and space between for a smaller car. The structure is ornate and of the generous dimension of 42 feet front, with a depth of 32 feet. It is planned on a scale to furnish the accommodations usually needed by the owner of a large house and as recommended for construction will prove an ornament to any estate.

For what are designated as the car spaces there is provided a granolithic floor of the best type, and each of these areas, adjacent to the sets of large double doors, is fitted for adequate drainage. The location of the drains and pitch of the floor, as seen on the accompanying drawing, shows one drain in the bottom of the pit, insuring a clean, workable place at all times, and the other at the floor level. Thus a separate washing floor is provided when the pit floor may be otherwise occupied.

In the construction of this building concrete is shown and advised for the foundations and footings. However, a good stone wall is extremely suitable if the wall is properly laid. If stone is used a good cement mortar should be supplied as the binder for tieing the wall units together.

Several banks of windows are set in the frame as the means of providing good lighting and ventilation. In addition the window shown at the ridge in the roof may be hinged and opened at any time in order to vent the room below. Electric bulbs should be supplied to suit the taste of the owner and conditions of the premises, and ample illumination furnished for the various spaces and rooms shown.

The main doorways of this garage, eight feet by nine feet, are provided with the type of doors which swing outward and are equipped with Stanley wrought iron garage door hinges, consisting of sets of No. 1459 and 1456 hinges and No. 1052 bolt. These hinges, designed for heavy doors, are exceptionally strong. They are equipped with ball bearings fitted between the hinge joints. Powerful leverage strength is provided by the long leaf, which also prevents the door from sagging. Time and labor are saved in hanging doors on these hinges, as the jamb only

is mortised, the door put in place and the surface leaf applied to the face of the door with either carriage bolts, lag or wood screws. The No. 1459 hinge is 36 inches long, having a 2½ inch offset and 4½ inch throw and the pad four inches wide. The purpose of the No. 1456 hinge is to swing a garage door clear of its opening. The strap is made in two sizes, 24 inch and 10 inch, and the usual method of hanging a garage door with them is to put a 24-inch strap at the top and bottom of the door and a 10-inch strap in the centre. Unusually heavy doors are strapped in accordance with architects' recommendations.

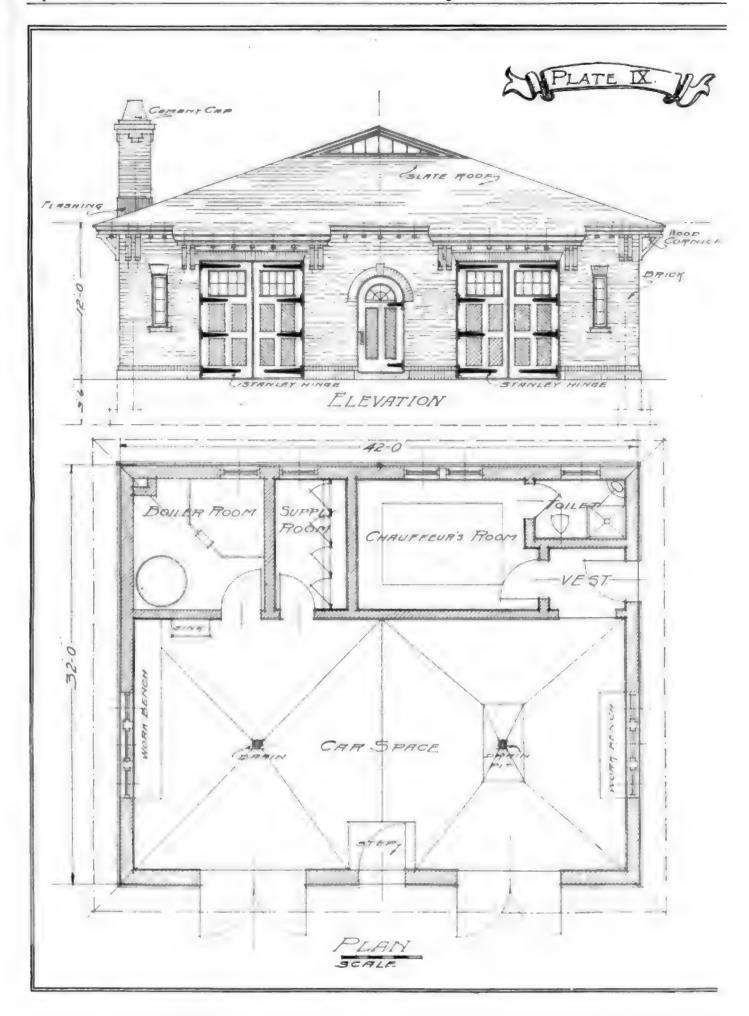
Garages represent a fixed investment and their doors should be hung on efficient hinges, letting the first cost of hanging the garage doors be the only cost.

On this garage the roof construction is of wood, having as a finish a choice of slate or asbestos shingles. Either material has fine quality as fire resistant. The entire trim is of wood, including cornice, brackets, windows, trim and doors. White pine or cypress should be used as tiese materials stand well under weather conditions.

In conveniences, appointments, extra rooms and storage there are very generous provisions in this garage model. In the rear will be found a chauffeur's room, off which there is a lavatory and shower bath. The toilet room should be finished in tile, with a hard plaster finish for the upper walls and ceiling. A large supply room has been provided, having several cupboards for storage, a system which experience has shown to be far superior to having them around the sides of the building near the car spaces.

A boiler room of ample size has been planned, with coal storage in a corner directly opposite the furnace, making firing convenient. The supply of working space in the garage has been borne in mind by the provision of two large work benches, and a sink is likewise provided.

Entrance may be had from the side of the garage into a vestibule which opens into the chauf feur's quarters and also directly into the garage. Another entrance is provided in the front, between the two large doorways. The cost is approximated, complete, at about \$3000.





The Emerson Motors Co., which is at present operating in a plant at Kingston, M. Y., is being reorganized as the Campbell Motor Car Co., taking the name of the president and general manager, T. A. Campbell. The new company will be eapitalized for about \$2,700,000. The company will manufacture a new car to sell for \$750 which will have the same motor as is being used in the Emerson ears, a Salisbury axle and Muncle gearset. About eighteen cars a week are being turned out by the present company which is said to have assets total-Mng \$600,000.

The Essex Motor Car Co., is a new concern organized by a number of officials of the Hudson Motor Car Comnamy of Detroit to manufacture a lighter car than the Hudson which will sell at a considerably lower price. The Officers are: president, W. J. McAneeny, factory superintendent of the Hudson company; vice president, R. B. Jackson, secretary and treasurer of the Hudson company; treasurer, A. Barit, purchasing agent of the Hudson company. These officials and Roy D. Chapin, O. H. McCormack and F. O. Bezner comprise the directorate. Mr. Chapin is president of the Hudson Motor Car Company, Mr. McCormack sales manager and Mr. Begner vice presi-

E. V. Anderson has been appointed receiver for the Sun Motor Car Company, Bikhart, Ind. The receiver states that from appearances of conditions surrounding the concern's affairs the administration contemplates a sale of the assets and winding up of the business of the company.

The Abbott Corporation, Cleveland, O., is introducing a new car in its 1918 line, betterments and improvements being incorporated in both the body as well as chassis design. A unit power plant is used with Continental 3½ x 5½ engine, disc clutch and selective type gearset. The wheel base of the new chassis is 122 inches. There are three models, the neven-passenger touring car at \$1,595; four-passenger roadster at \$1,595 and a four-passenger coupe and five-passenger sedan each priced at \$2,150.

The Maxwell Motor Co., Detroit, has taken over the Chalmers Motor Company plant under the terms of the lease by which the latter will be operated by the former organization for a period of five years. Notice of the change which has been posted in the Chaimers plant states that Walter E. Flanders, president and General Manager of the Maxwell Company and other officers will have charge of operations in the plant and that an announcement will be made later regarding the names of the men who will be in direct supervision of the different departments. All the officers of the Chalmers company resigned following the execution of the lease and a number of New York lawyers who negotiated the lease were elected in their places. Hugh Chalmers, however, while retiring from the presidency, will remain as chairman of the Board of Directors.

The Grant Motor Car Corp., Cleveland,

O., is planning the erection of an extension to its plant, four stories in height and 875×60 feet. The cost will approximate \$750,000.

The Ross Automobile Co., Detroit, Mich., has been placed in the hands of a temporary receiver and it is expected that the creditors will receive their claims in full. H. D. W. Mackaye, formerly general manager of the company, has been appointed temporary receiver.

John H. Lemmon, formerly with the Watrous-Esty Advertising Co., the Macavoy Advertising Co. and more recently connected with the Nichols-Finn Advertising Co., has been appointed advertising manager of the Sterling Motor Truck Co., Milwaukee, Wis

The Winton Co., Cleveland, O., has announced an increase in the price of the Winton Six model "33" five pasenger touring car, which will become effective on October 15. This model which now sells for \$2,685 will be advanced to \$2,950 and proportionate advances will be made on the prices of other body types, both open and closed in this model. company, however, will accept all orders booked before October 15 and for delivery prior to December 1st at the present No change in the price of the Model "48" Winton which sells at \$3,500 has been announced but it is not unlikely that a raise will be made at an early date.

The American Brass Foundry Co., Milwaukee, Wis., has changed its name to The American Metal Parts Co. The change was made following the purchase of an interest in the business by S. A. Fulton, president of the Fulton Co., of Milwaukee, 726 National Avenue which handles the entire sales of American Bumpers and other products of the Metal Parts company.

The Doble-Detroit Steam Motors Company has leased the plant at Fourth and Porter Streets, Detroit, that was formerly occupied by the Bolles Iron Works. The joint offices of the company and the General Engineering Company, now at 808 Marquette Building, will be continued. It is expected that deliveries will commence about the first of the year and the manufacturing schedule calls for a production of 2,500 cars annually.

Arthur N. Goodfellow has been appointed western sales manager of the Nice Ball Bearing Co., Nicetown, Philadelphia, Pa. He will have headquarters in Detroit at 1248 Book Building. Mr. Goodfellow was formerly associated with the Standard Roller Bearing Co.

Hai T. Bouldon, sales director of the Selden Truck Sales Co., Rochester, N. Y., distributors of Selden trucks in the United States, has called the annual sales conference of the division sales managers, which will be held in Rochester during the week beginning Oct. 1.

W. C. Durant, head of the General Motors Corporation, in answer to some rumors recently current in the financial district, states that the company is not contemplating any financing nor any consolidation of companies. In explaining the present financial status of the company he stated that the company had not

sold any cars except for spot cash and that it had more than \$15,000,000 cash in banks plus \$1,000,000 Liberty bonds and nearly \$5,000,000 of sight drafts in connection with cars in process of delivery. From Aug. 1 to Sept. 12, 2349 Cadillac cars were sold, against 452 in the same period last year; 3740 Oldsmobiles, against 1074 last year; 16,039 Buicks, against 12,120 last year, and 829 trucks against 316 last year, making a total of 27,071 for the period against 16,963 in the same period last year.

The Kissel Motor Car Co., Hartford, Wis., has announced the appointment of the following new dealers for KisselKars and trucks: E. A. Roemer, Creighton, Neb.; Wakefield Motor Co., Wakefield, Neb.; S. E. Newell, New Philadelphia, O.; J. H. Colliflower, 130 Fourth street, S. W., Canton, O.; J. R. Bennett, Clio, S. C.; Hall-Hicks & Steele, Rigby, Ida.; Medford & White, Grace, Ida.; King Auto and Repair Co., Charleston, S. C.; L. Bennett & Co., Orangeburg, S. C.; Steubensville Hardware and Supply Co., Steubensville, O.; Sussex Garage, Sussex, Wis.; Crescent Auto Co., Peoria, Ill.; Buhl Auto Co., Buhl, Ida.; Heath Motor Co., 1610 Euclid avenue, Cleveland, O.; Bakersfield Motor Car Co., Bakersfield, Cal.; P. A. Simon, Mina, Nev.; A. D. Adkins, Thompson, Ga.; Frank L. Fries, Kittaning, Pa.; International Rubber Sales Co., Wheeling, Va.; L. H. Church, Rio Vista, Cal. T. S. & W. E. Jeanes, Sylvester, Ga.

The Prest-O-Lite Co., Indianapolis, Ind., has appointed the following new service stations for Prest-O-Lite storage battery service: Corning Battery Co., Corning, Ia.; Westminster Garage, Venice, Cal.; Mills & Condiff, 357 West Eighth street, Riverside, Cal.; Reedy-Naddy Auto Supply Co., Fourth and Spring streets, Columbus, O.; Paul Henderson Garage Co., Morristown, Tenn.; Kelly's Garage, El Reno, Okla.; Browning Auto and Supply Co., Idaho Falls, Ida. W. L. Ramer, 330 Walnut street, Red Bluff, Cal.; O. L. Bowen, 144 W. Bridge street, Blackfoot, Ida.; Cockerofts Garage, Corning, Cal.; The Nichoalds Co., 424 Grand River avenue, Detroit, Mich.

William C. Little, western sales representative of the Bearings Company of America, of Lancaster, Pa., has moved his offices in Detroit to 1012 Ford tuilding. His headquarters were formerly at 604 Ford building in that city.

J. A. Dieber has been appointed buyer and manager of the sporting goods and automobile accessories department of the G. Sommers & Co., St. Paul, Minn, He succeeds L. T. Ware,

The Westcott Motor Car Co., Springfield, O., for the year ending June 30, 1917, reports the largest business in its history and a preliminary report on the business for the first quarter of the current fiscal year shows sales nearly double the average quarterly business for the fiscal year just closed.

W. H. De Lancey has been appointed manager of the new branch of the Empire Rubber and Tire Co., recently opened in the Traders' building, 19th and Campbell streets, Kansas City, Mo.



should be packed and tightened to prevent leakage.

The next important part of the water cooling system is the radiator, which frequently fills up with sediment or rust. This important part should receive as much consideration and care as any other part of the car. The radiator should be cleaned regularly so that it will function properly. If this is done it will go a long way toward the prevention of pump trouble and keeping the engine efficient.

Many of the more common radiator troubles can be avoided if proper attention is paid the water supply. The use of pure water or water that has been filtered through cheese cloth is to be recommended. If the cooling system is filled with rust or deposits the water jackets should be opened if possible and cleaned with a scraper.

In ordinary cases three remedies are possible. One method which is often recommended consists of putting about onefourth of a pint of glycerine in the radiator and letting it remain there for a week or two, running the engine frequently. At the end of that time the water mixture should be removed. the radiator flushed with water and refilled.

Another remedy often used consists of dissolving about one-half a pound of washing soda in the cooling liquid, letting it remain in the system during the day, while the engine is being run frequently. Then draining it off and flushing out the system thoroughly. In the third remedy potash lye is used in the same manner as was the washing soda.

In both thermo-syphon and pump systems the flushing should be done while the engine is running; the stream from a hose turned into the filler cap while the system is being drained.

STORAGE BATTERY CONSTRUCTION.

(J. T., Attleboro, Mass.)

Will you please tell me what elements are used in an ordinary lead storage battery, what happens when it is charged and how to store it for the winter?

The lead type of storage battery is simple in construction yet it requires attention just as much as any part of the automobile. If it is properly attended to it will last for many years and cause little or no trouble; neglect it, however, and trouble begins to appear. Lights burn dim, the starter will not work and the ignition sometimes fails.

The lead type of storage battery is composed of a number of cells. Each cell in itself is a unit and furnishes about two volts when fully charged. The cells are packed in a wax or paraffine covered box, with the connections between them bolted or burned together.

Each cell consists of what is called an element, which is immersed in a mixture of chemically pure sulphuric acid and distilled water. The element and electrolyte is contained in a jar, which is covered and sealed so that it is water and air tight, with the exception of a small hole in the top, through which the electrolyte may be renewed and to allow for the escape of gas.

The element consists of a number of dark brown metallic plates made of lead peroxide, joined together at the top by what is termed a post strap, and another similar row of slate gray plates made of sponge lead, insulated from each other by thin corrugated wood or composition separators.

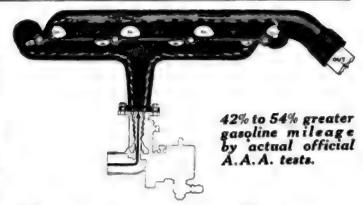
The dark brown plates are positive, while the slate gray are negative, and an element always consists of one more negative than positive plate. The capacity of the battery is dependent upon the number of plates and their areas.

If simply lead pexoride and sponge lead were used the plates would soon buckle and the battery would be ruined, so the plates are reinforced by a lattice work of an alloy of lead and antimony, whch serves not only to reinforce the plate, but to conduct the current and lower the internal resistance.

The element rests upon a number of ribs or bridges, which are made in the lower part of the jar, forming a space in which to hold the sediment thrown off from the plates.

This is the construction of a lead type storage battery when fully charged. The electrolyte, as has been said before, consists of sulphuric acid and water, having a density or specific gravity of from 1.285 to 1.300.

When an electric circuit is made a change takes place in



More Gasoline Miles

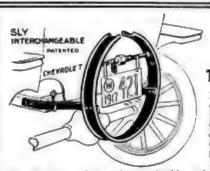
THE Wilmo Manifold produces many more miles from every gallon, and practically eliminates carbon. Attached in few minutes with ordinary monkeywrench. \$7.50 (Ford size) and up.

Ask Garage Man or Write Direct GIVING HIS NAME

The Whittier Co., 239 First National Bank Building CHICAGO, ILLINOIS

Wilmo Manifold





SLY Interchangeable Cradle Type

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In terchangeables quickly adjustable for all Ford and Chevrolet tires and demountable rims. Combines place for lamp, number plate, lock and tire, hold-

ing by expansion grip on inside of tire. chafing. Clamps to Ford or Chevrolet frame without drilling or bolting. At all jobbers, or write

New Era Spring & Specialty Co. 865-A Woodward Ave. Detroit, Mich.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



begins to knock. I have had the crankshaft and connecting rods examined and they are tight. The wrist pins have been bushed recently. Do you think that the knock is in the cambaft or timing gears?

From what you write we doubt if the knock is due to camshaft or timing gear trouble, though it is such an easy matter to determine this that it would be advisable to try the following experiment:

Remove the timing box cover and firmly grasp the end of the shaft which carries the roller contact. By working this up and down you can locate any play should there be any in the camshaft. By twisting it back and forth you can locate any back lash or lost motion in the timing gears.

It would be a good plan to verify the valve timing by turning the crank until one of the pistons is at the top of its exhaust stroke, then turning it down 1/16 inch. At this point the intake valve should begin to open. When the valves are set correctly the exhaust will close at top centre and the intake will close 9/16 after bottom centre.

After the engine has warmed up thoroughly measure the distance between the tappets and valve stem. This distance should be about 1/64 of an inch.

If the knock is not due to carbon deposits in the cylinders you will probably find that the knock is due to flywheel or gearset trouble. A knock in the transmission is often of such volume as to seem to arise from the engine.

The frequent cause of such a severe knock as you mention is a loose flywheel. The Ford flywheel is mounted upon two dowel pins and held by a number of bolts. The strain of the transmission frequently causes the flywheel to work loose and result in a knock when running at high speeds or under a load.

A worn universal joint or a joint that is loose upon either the propeller or drive shaft will cause a knock when running at high speeds. There have been cases where a knock of this type seemed to come from the front of the engine.

LOSS OF COMPRESSION. (R. J. M., Philadelphia, Pa.)

The engine of my Ford 1914 car lacks compression and i find that I can spin it with comparatively little effort. It will rum fairly smooth on the level, but lacks power on the hills. Can you tell me how to increase the compression?

The loss of compression may be due to trouble in the cylinders, pistons, valves or spark plugs, and it will be necessary for you to locate the leakage before you can remedy it.

With the engine running at normal speed, with an oil can squirt a few drops of oil upon the spark plugs at the joints. Should bubbles form it will indicate gas leakage and the joints should be made tight. If the plugs are at fault where the porcelain or mica retaining nut is located, the nut should be removed, the porcelain or mica taken out and the copperasbestos gaskets replaced with new. The nut should then be put back and screwed down tightly.

If the leakage occurs where the plug is screwed into the cylinder the plug should be removed and the threads covered with a paste made of graphite and oil. Care should be observed in returning the plugs to turn them down tightly.

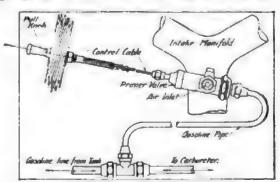
The next point for examination is the valves. If they have not been ground recently they should be ground into place very carefully. The strength of the valve springs should be noted and if they can be replaced without the use of a valve spring lifter they are too weak and should be replaced with new.

The clearance between the valve stems and tappets should be adjusted so that the distance is about the thickness of a business card. This adjustment should be made after the engine is heated.

While the cylinder head is off the engine, make a careful examination of the cylinder walls. Dirt or grit sometimes works into the cylinders and the cylinder walls become scored or scratched, allowing gas leakage past the pistons. Ordinary scratches may be repaired by the following method:

With the engine running at normal speed, slowly pour about one teaspoonful of Dixon's flake graphite into the carSell the Guaranteed, Never Failing, Battery Time and Labor Saving

COPLEY PRIMER



If motors were hard to start all summer what will happen this winter?

With a dependable Copley Primer installed, any engine will start on the first turn regardless of cold and oth r adverse conditions. It is Primer delivers to the engine a rich but highly explosive charge of carefully determined proportions at the correct time, and continues to do so as long as the Primer is held open.

It is an activary carburetor and can be installed in 30 minutes or less and is controlled from the dash.

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TIMES BUILDING PAWTUCKET, R. I.



move one of the spark plugs. Pour in about two tablespoonfuls of kerosene oil and replace the plug, letting it stand all night. Treat the other cylinder, one a day, until all have been treated. As a general rule the carbon will be blown through the exhaust the next morning.

If the knock is not caused by excess carbon it may be due to a loose bearing. In this case the bearing should be repaired as soon as possible or the engine may be damaged. Remove the oil base from the engine and examine all of the connecting rod and main bearings.

DELCO SYSTEM TROUBLES.

(J. B., Bridgeport, Conn.)

Will you please tell me how to test the coil and condenser of a Delco system, installed on a Cadillac 1914 car?

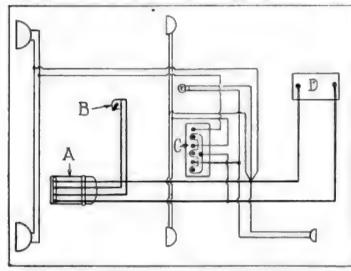
How are the straps and plates burned together in a storage battery?

Can I use the old sealing compound for resealing the battery and how can I soften it so that it can be used?

The cut out of the electrical system (Delco) sticks so that when the engine stops I have to open the contacts by hand or the current runs back to the generator. What is the trouble and how can I remedy it?

Will you please give me a wiring diagram of a Northeast 12 volt system?

The Delco coil is of the non-vibrating type and does not



Northeast Standard Wiring Model E, 12 Volt. Copied from American Bureau of Engineering Wiring Diagrams. A, Motor Generator; B, Starting Switch; C, Light Switch; D, Battery.

contain a condenser, the condenser being located upon the distributor unit. With the system in the car it may be tested as follows:

With the ignition switch in the "off" position turn the engine over with the hand crank until the points in the breaker box are together. Remove the secondary or centre wire from the distributor and hold it about 1/16 of an inch from the engine block. Then press the breaker points apart with the finger and have an assistant throw the ignition switch to the "On" position. Let the breaker points come together and separate them quickly. When this is done a spark should pass between the secondary wire and the engine block.

If the system has been removed from the car, place the coil upon a table and pass a heavy wire (iron or copper) across the end about 1/16 of an inch from both primary terminals and connect it with the secondary terminal. Connect one of primary terminals with a six-volt (three cell) storage battery. Connect the other primary terminal with one of the condenser terminals. Connect a wire with the other terminal of the storage battery and snap it across the remaining condenser terminal. If a spark is formed, indicating a passage of current, it is an indication that the condenser is short circuited or ruptured and needs replacing. If no spark



SATISFACTION

Specify Bosch Magneto Ignition for your engine. You will enjoy the satisfactory confidence that your ignition system is reliable, amply efficient, and troubleproof. You can't be satisfied with ignition less reliable than

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More Lite Lens were designed by experts and are made by specialists. The prisms are so arranged that the blinding glare from the use of ordinary glass is absolutely overcome,

glass is absolutely overcome, yet the light rays are increased and diffused over all the road and on both sides so that the driver can see clearly at all angles,

To install: Merely remove present glasses and insert

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Guaranteed by the maker and endorsed in all states having

a non-glare law.

Compare these prices with other makes, then send your order direct or buy from nearest dealer. Look for "More Lite"

on every lens.

CLEAR WHITE

7½= 8½ diameter, in inches, per pair. \$1.56

83½= 9½ diameter, in inches, per pair. 1.75

9½=10½ diameter, in inches, per pair. 2.00

10½=10¾ diameter, in inches, per pair. 2.25

AMBER

7½= 8½ diameter, in inches, per pair. \$3.00

8%= 9½ diameter, in inches, per pair. 2.25

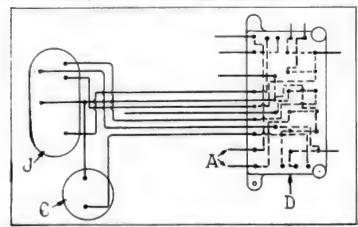
9¾=10½ diameter, in inches, per pair. 2.25

10½=10¾ diameter, in inches, per pair. 2.50

L. E SMITH GLASS COMPANY
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Junction Box Diagram: A, Wires to Horn Button; C, Current Indicator; D, Junction Block; J, Lighting Switch.

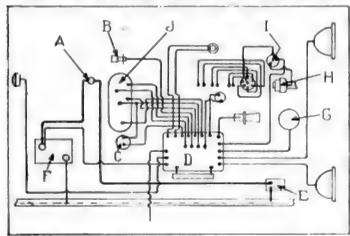
At the top of the steering gear case is a clamping bolt. This bolt should be loosened and the worm adjusting nut removed, thus allowing the worm and bearings to be withdrawn and the steering gear disassembled.

Timing and Adjustments.

As a general rule the timing gears are marked so that they may be set correctly. If they are not marked they may be set as follows: Turn the crankshaft with the hand crank until the flywheel marking UP-D-C-I is beneath the arrow. Then turn it forward five degrees. Next turn the camshaft counter clockwise until the intake valve in No. 1 cylinder is just opening. Then drive on the timing gear and mesh the gears. This setting can be checked by marks upon the flywheel, which indicate the opening and closing of all of the valves.

To set the spark the spark control lever should be set to extreme advanced position and the piston in No. 1 cylinder brought to the beginning of the compression stroke. The beginning of the compression stroke may be detected by holding the thumb over the open petcock until compression is felt. The upper dead centre position is indicated by the mark UP-D-C-I on the flywheel coming under the pointer at the top of the flywheel. Turn the crank until this mark has four inches to travel (for the four-cylinder engine) or 5% inches (for the six).

Remove the distributor cover without disconnecting the wires, lift off the distributing segment holder and loosen the put which holds the cam on the tapered shaft. After the cam has been pried from its seat turn it in a counter clockwise direction until it reaches a position such that when all parts are replaced the edge of the distributing segment will come directly under No. 1 distributor terminal. Then continue to turn the cam until the breaker points start to separate. Tighten the lock nut so as to hold the cam in this position and replace the distributing segment and cover. Check over the timing by removing the centre wire from the dis-



Wiring Diagram: A, Starting Switch; B, Speedometer Lamp; C, Current Indicator; D, Junction Block; E, Starter; F, Battery; G, Generator; H, Distributor; I, Coil; J, Lighting Switch.

Friction starts <u>Grinding</u> before Grease begins <u>Lubricating</u>

Common grease needs heat to soften it before it can lubricate. The parts grinding together must furnish this heat in the shape of friction. Meanwhile these parts get no lubrication. And Friction—getting a good start—is never caught with by grease.



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NON-FLUID OIL lubricates the second your car moves from rest—and every minute it is in motion. Doesn't give friction a chance to start. It never melts, never leaks out, is much purer and longer lasting than any grease you can buy.

If you buy lubricants on the same basis that you buy tires purely on service, you'll ask for NON-FLUID OIL every time. Get "K-oo Special" grade for pears; "K-ooo" grade for bearings. Sold at your dealers in orange-colored cans only.

Write for a free booklet, "Lubrication of the Motor Car."

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WHY are Paige Dealers so loyal to their car and their company?

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Paige Dealers Are Satisfied Dealers Paige Dealers Are Money Making Dealers

Let us give you some figures: Since the first of last January the business of the Paige-Detroit Motor Car Company has increased precisely 64 9-10 per cent over the corresponding period of last year—which, of course, was a record year itself.

Since January first six Paige Dealers have increased their business over 200 per cent—many over 100 per cent. Every Paige Dealer shows a substantial increase.

As the Paige Company has grown, Paige Dealers have grown. As the Paige Company has prospered, Paige Dealers have prospered.

The overwhelming popularity of Paige cars has made and is making and will continue to make them big business and big profits.

The mechanical excellence of Paige Cars, the satisfaction of owners enable Paige Dealers to keep their business and their profits. But—most important of all—in the judgment of 1500 Paige Dealers is the tremendous asset and protection and satisfaction in doing business with a company that is built upon the soundest financial foundation and soundest manufacturing and merchandising principles.

Paige Dealers know that the Paige-Detroit Motor Car Company with its great resources, its conservative and constructive management and splendid organization is strong to weather any storm—is built and destined to endure.

Paige Dealers know that their investments, their business and their futures are secure.

With the wide range of Paige models and the wide range of Paige prices, Paige Dealers, too, have the greatest selling opportunities.

Paige-Detroit Motor Car Company, Detroit, Michigan

THE BRAKE THAT IS THERE WHEN NEEDED





The Perfect, Practical, Positive Brake For Ford Cars NOT ONLY MAKES YOU FEEL SAFE, BUT ASSURES YOUR SAFETY

HOLDFORD BRAKES are high-grade external contracting brakes for Ford cars, which can be easily and quickly installed to act from the hand lever as emergency brakes, or from the foot pedal as service brakes. Designed in accordance with the best engineering practice; the band and brace are of steel, the toggle crank and bracket are drop forgings and the lining J-M non-burn. Do not drag when released, no readjustment for wear is necessary and oiling is easy.

The brake usually supplied with this car cannot be depended upon in that "tight corner" or "on the hill." The hand brake wears out quickly and allows the car to creep when being cranked. The constant use of the foot brake quickly wears out the transmission. As the foot brake operates from the drive shaft any accident to the axle or the stripping of gears might mean a serious accident.

HOLDFORD BRAKES save wear and tear and will be attached by the wise owner on his pleasure car, delivery car or truck. They will positively stop a Ford with locked wheels on any grade, at any speed, with any load. Not necessary to remove old brakes. (When ordering state whether hand or foot brakes are wanted).

THE G. H. DYER COMPANY

Cambridge, Mass.

"The time has come to conquer or submit."

"For us there is but one choice. We have made it."

-President Wilson

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These new United States Government Bonds are issued in denominations of \$50 and multiples thereof. The United States Treasury will pay you interest at 4% per annum, payable semi-annually.

EASY PAYMENTS—You can pay 2% on your bonds when you make your application, 18% November 15, 40% December 15, and 40% January 15, 1918. For example, when you buy a \$100 bond you can pay \$2 now, \$18 November 15, \$40 December 15, and \$40 January 15.

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Liberty Bonds are the best security in the world. They are readily saleable and are practically exempt from taxation for people of moderate incomes. The law permits their conversion into bonds bearing higher interest should such bonds be issued by the Government in the future.

Help Your Country and Yourself Help Our Boys "Over There"-

Get an official Liberty Loan blank from Any Bank or Trust Company

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Subscribe Now!



WINTER equipment for the motor car is an annually recurring question that confronts the motorist at this season. With every passing year, unless it be in the more rigorous climates of the northern tier, the number of car owners who lay up their cars for the winter season becomes less and less, for many reasons. Street cars and other public conveyances subject one to many inconveniences, delays and undesirable associations. Since the motor car is the standard private conveyance of this era, his own car must necessarily be the medium of the comings and goings of nearly every one who stirs away from home and fireside at all. As it is the custom of the publisher annually to collect complete data on accessories and equipment for winter motoring, the latest and best information is always to be found in the Automobile Journal Winter Equipment article. This article is now in preparation for a forthcoming issue of this magazine.

HERE has been unusual agitation this fall over the matter of lamps, owing to the widespread adoption of restrictive legislation regulating automobile headlights. "Lighting the Road" is the driver's greatest desire. The coming of long nights, the increased use of the motor after nightfall, due to war conditions and the spread of the all-year usage idea, makes this topic a leading one with all mo-In this issue the light torists. laws of all the states are compiled in brief and succinct form, illustrated with art diagrams and diagrammatic sketches showing the safety limits for motorists everywhere.

N EXT issue in the Garage series there will be a design of a two-car garage, with a rear section equipped as a machine shop, the home mechanic's garage.

VOL. LXIV. OCT. 10, 1917. NO. 5 NTEN Page Lighting the Road..... Facts for the Motorist as to Automobile Head Lights. Light Laws of All the States.....10 No Turning Away Customers....12 Used Car Values......13 War Tax on Automobiles......16 Overhauling the Automobile.....17 Detailed Methods for the Dodge Brothers Car. Fashion's Motoring Trinity......20 By Mrs. A. Sherman Hitchcock. Driving a New Car to Death.....22 National Automobile Association. .23 National Highways Association...26 Nash Six Description......27 New Parts Making Giant......29 Accessories and Equipment.....31 Providing Gasoline for Us......33 Address Delivered at the War Business Convention. By A. C. Bedford. Garages—Plate X......36 A Small, Convenient Car House for the Home Lot. General News of the Industry....38 Drawings for National Shows....40 Queries41 -:::-Treasurer . . WILLIAM H. BLACK Secretary D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

THE Automobile Journal maintains that set prices on used cars, rated according to the make and model, are a detriment to the trade, a handicap to the manufacturer and an injury to car owners. It maintains that the service worth of a machine is the only safe criterion by which its value may be rightly judged and that the used car business, by insistent, progressive steps, must be established as a real business in order to arrive at the ultimate, proper solution of what is commonly termed the Used Car Problem. Efforts to establish a flat, off-hand price by any person, body or publication show a persistent disregard of the best interests of every element in motordom and merit nothing but disapproval and prompt discontinuance. The best conservation and constructive policies demand the handling of used cars on their distinctive merits, with methods that meet the approval of dealer and owner. More quotations from the used car market and other articles proving this appear in this issue and there are more to follow.

THE National Automobile Association news in this number will be found on pages 23-26. The bulletins are a helpful service to all motorists. Motorists who join the association receive the benefit of personal, legal and touring advice, in addition to many other benefits. Application blanks and full information obtainable at the address given in the heading on page 23.

WAR'S duties are upon the motorist everywhere. There are Liberty Bonds to buy, gasoline to save and a war tax to pay. Illuminating treatments of these vital questions are to be found in every issue of this magazine, and particular attention is called in this number to the able statement of the gasoline situation by that eminent authority, A. C. Bedford.







Lighting Requirements of All the States

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[&]quot;In these states the law stipulating the volume of illumination requires that it be sufficient also to illuminate the road 10 feet to the side of the car at a distance 10 feet ahead of the lamps.

In California, Connecticut, Denver (Col), Iowa, Maine, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Ohio, Oregon, Utah, Vermont and Washington the regulations covering the beam of light are in brief as follows: Parallel, focalized rays, from lamps of more than 4 candle power, gathered and projected by a reflector, lens or other device, must not raise more than 42 inches above level surface of road on which vehicle stands, under all conditions of lond, at a distance of 75 feet or more ahead of lamps. Missachusetts requirements are similar, only that the distance is 50 feet instead of 75, and in Florida and Texas the rays should not shine directly over 48 inches above the level of the road.

Illumination, liberally interpreted, means sufficient light to reveal any person, vehicle or substantial object, and the distance given means the minimum number of fect ahead of the car at which light will have that effect.

In the highway regulations of the District of Columbia it is specified that the tail light be carried on the left side, but the location is not designated in the statutes of the states. Tail lights in Indiana must be independent of other lights and capable of being lighted or extinguished only when the vehicle is stationary.

Blank spaces in the columns indicate that the laws do not specify any regulations under that caption.

Spotlight or Searchlight Regulations

Alabama-No provision. Arizona-No provision.

Arkansas-No provision.

California—Deflection of beam subject to headlight requirements.

Colorado (Denver)-Deflection of beam subject to headlight requirements: must not sell, offer for sale or have in possession with intent to sell, any vehicle equipped with lighting device of over four candle power with reflector, unless same complies with special lighting law.

Connecticut-Deflection of beam subject to headlight requirements; must not be directed in face of approaching driver.

Delaware-Light must be projected on road not exceeding 10 feet ahead of car; used only for accidents, reading signs and numbers and examining edge of road: must not be used as permanent headlight or for driving.

District of Columbia—Must be equipped with dimming device.

Florida-Must be deflected so beam will not rise over four feet above road level.

Georgia-No provision.

Idaho-No provision.

Illinois-In Chicago, must not sell, offer for sale or bave in possession with intent to sell, any vehicle equipped with lighting device of over four candle power with reflector, unless same complies with special lighting law.

Indiana-Must be equipped with dimming device; light must be projected directly upon road not exceeding 50 feet ahead of car.

Iowa-Deflection of beam subject to headlight requirements; light must not be thrown in face of approaching driver.

Kansas-Must be equipped with dimming device and must not be thrown in face of approaching driver.

Kentucky-No provision.

Louisiana-No provision.

Maine-Must not be used as permanent headlight or for driving; and should be used only when car is stationary, in reverse or at slow speed and must not be thrown in face of approaching driver.

Maryland-No provision.

Massachusetts-No provision.

Michigan-Must be equipped with dimming device and must not be thrown in face of approaching driver.

Minnesota—No provision.

Mississippi-No provision.

Missouri-Must be directed down while driving and used only in emergencies in cities and towns.

Montana-No provision.

Nebraska-Must be projected directly upon road not exceeding 30 feet ahead of

Nevada-Must be equipped with dimming device and must not be thrown in face of approaching driver.

New Hampshire-Must be equipped with dimming device and must not be thrown in face of approaching drivers.

New Jersey-Must be used only for reading signs and house numbers and not as a permanent headlight or for driving.

New Mexico-No provision.

New York-Deflection of beam subject to headlight requirements.

North Carolina-Deflection of beam subject to headlight requirements.

North Dakota-Deflection of beam subject to headlight requirements; must be projected directly upon road not exceeding 30 feet ahead of car.

Ohio-Deflection of beam subject to headlight requirements; light must not be thrown in face of approaching driver and must be projected directly upon the road not exceeding 50 feet ahead of car, and not exceeding 60 feet when approaching another car.

Oregon-Deflection of beam subject to headlight requirements.

Pennsylvania-No provision.

Rhode Island-No provision.

South Carolina-No provision.

South Dakota-Deflection of beam subject to headlight requirements.

Tennessee-No provision.

Texas-Deflection subject to headlight requirements, must not project over 48 inches above level of road.

Utah-Deflection of beam subject to headlight requirements; must be projected directly upon road not exceeding 30 feet shead of car

Vermont-Deflection of beam subject to headlight requirements; must be projected directly upon road not exceeding 30 feet ahead of car; light must not be thrown in face of approaching driver.

Virginia-No provision.

Washington-Deflection of beam subject to headlight requirements; light must not be thrown in face of approaching driver; must not sell, offer for sale or have in possession with intent to sell, any vehicle equipped with lighting device of over four candle power with reflector, unless same complies with special lighting law.

West Virginia-No provision.

Wisconsin-No provision.

Wyoming-Must be equipped with dimming device and must only be used in emergency and for rounding turns.

Dimming, Shading and Regulations for Diffusion

Other regulations of headlights in the different states are classed as to their relation to dimming devices and their control. Headlights must be dimmed or shaded, or rays diffused to prevent glare, by some coating or other device in the following states: Delaware, Florida, Chicago, Ill.; Indiana, Kansas, Maine, Michigan, Missouri, Nevada, New Hampshire, New Jersey, Ohio, Oregon, South Dakota, Texas, Wyoming. In Illinois and Michigan the devices must be so constructed that they can be manipulated at the will of the driver and in New Jersey they must not be capable of being operated from driver's seat if lamp can project rays more than 41/2 feet above road.

In New Jersey and New Hampshire dimming devices and lenses must meet with the approval of the commissioners of motor vehicles; in Chicago by the motor vehicle light inspection and in the District of Columbia by the commissioners of the district.

The public utilities commission of Maine and the state board of public roads of Rhode Island have power to Philadelphia Automobile promulgate headlight regulations.

In Chicago the manufacturer, distributor or wholesaler of automobiles may affix a tag upon lighting equipment showing that same has been inspected by the board of motor vehicle light inspection and approved.

Cities Grasp Trailer Economies.

Municipal trailers are a motive economy brought to prominence by the new haulage, labor and traffic problems occasioned by the great war. Cities announced by the Troy Wagon Works Co., as using their trailers include Detroit. Minneapolis, St. Paul, Duluth, Montgomery and Birmingham, Ala., Binghamton, N. Y., Buffalo, N. Y., and Cleveland, O. Trailer installations in all these municitalities it is claimed, have resulted in expedition of improvement work that stood in danger of failing of accomplishment as their equipment stood.

Show.

The 1918 automobile show of the Philadelphia Automobile Trade Association will be held in the Commercial Museum Building, in that city from January 11 to 19 inclusive. The show committee is composed of; chairman, John Fassitt of the Pierce Arrow; Albert E. Maltby of the Winton; J. E. Gomery of the Hudson; Louis C. Block of the Ford and Lee J. Eastman of the Packard.

Homer McKee Becomes Distributor.

Homer McKee, advertising director of the Premier Motor Corp., and at one time advertising manager of the Cole Motor Car Co., has organized the Homer Mc-Kee Co., Inc., at Cleveland, O., where the concern will act as distributing agents for the Premier car, J. Y. Tractor and Hoosier Sub Carburetor. Associated with him in the business are Aaron Wolfson and Fred H. Hoover.





DODGE Touring car; in fine shape; tires and paint like new; others ask \$650; our

1916 and 1917 DODGE Touring cars \$490

up; like new

Model 83 Rebuilt 1916 OVERLAND Touring car; a real family car that we guarantee until Jan. 1. It will pay you to see it and try it out, 1916 SAXON Six Touring; like

thoroughly overhauled; a snap at \$550. COLE 6-passenger Touring car; in fine order; a snap at \$590.

Guaranteed OVERLAND Touring car: 5passenger; in fine condition; guaranteed to Jan. 1; \$350.

MAXWELL Touring car; fine order; like

a new car; if sold by Wednesday, \$390. Extra snaps; price cut to \$250 from \$450 to \$500; BUICK Roadsters; five of these; MARION Touring cars; CADILLAC Touring car.

Two METZ Touring cars; if you are looking for the most for your money see these

at our prices; \$250 up. PUGH BROS.

63 Mathewson St. Providence, R. I.

BOSTON.

1915 LOCOMOBILE Limousine; been used by private family near Boston and posi-tively looks and runs like a brand new car; excellent reasons given by owner wishing to dispose of this high grade per-

foct car; guaranteed fully.

1916 CADILLAC Touring, \$1050; run less than 4000 miles; as owner has been away for five months; guaranteed in perfect throughout and

demonstrated.

STUDEBAKER Roadster, \$675; series "18;" cost \$1100 and only run 325 miles; owned by young lady who is going away to school and has no further use for it; full guarantee and thorough demonstration. APPERSON Chummy Roadster, \$750; finest possible condition; always had excellent care and is speedy, powerful and easy riding; call for this fine trade.

1916 HUDSON Cabriolet, \$800; model 6-40;

always owned and driven by elderly couple and used very little; these owners have no further use for a car and will sacrifice for quick sale; call for thorough demonstra-

tion and genuine bargain.

OVERLAND Roadster, \$375; model 1916 83; been thoroughly refinished through-out and positively cannot be told from a brand new car; all good shoes and ex-

tra; call for genuine bargain.

"35" PACKARD Limousine, \$750; just been thoroughly overhauled and repainted and looks and runs like a brand new car; has electric self-starter and lights and all ex-

tras; a fine family or renting car.
1917 HUDSON Cabriolet, \$1550; almost brand new; run less than 2100 miles and is in perfect condition throughout; very latest model; all new shoes and paint perfect; call and ride in this popular all-year-round car; guaranteed.

1916 STUTZ 4-passenger, \$1150; regular touring model, divided front seats and is mechanically perfect; very powerful and speedy and climb any hill; call for thorough demonstration of this popular

1917 MITCHELL Touring, \$750; this fine light family touring car seats seven and

is inexpensive to operate and very easy riding, plenty of power and quiet run-ning; all good shoes and original paint is perfect

1916 PAIGE Touring, \$575; this fine light six-cylinder, 7-passenger touring car has been throughly overhauled and looks and runs like a new car, all fine shoes, etc.; this trade must be seen to be appreciated.
1916 STEARNS Touring, \$575; silent
Knight; 4-cylinder and just like new
throughout; all fine shoes and original
paint perfect; light and inexpensive to operate and casy riding. GHORGE GROW,

821-323 Columbus Avenue, Boston, Mass.

1916 CHANDLER Roadster, \$550; ready for the test, easy riding, powerful and economical; must be seen to be appre-ciated; fully guaranteed.

1916 CHANDLER, \$550; touring; mechan-ically in first class condition; very fine for small family; fully guaranteed and demonstrated.

RENAULT Limousine; just the car for renting; very economical and good for a lifetime; in fine condition and has special built body; call and look this over. 1917 FORD Roadster, \$295; original tires; run about 1200 miles; shock absorbers and

runs like new; needs a wash and you have a new car; call early.

1916 OLDSMOBILE "8," \$650; powerful, quiet and comfortable; newly painted and overhauled; cannot be told from new; call and ride

METROPOLITAN USED CAR CO., 16 Columbus Avenue, Boston, Mass.

Boston Holds Closed Car Week for Motorists

YEW ENGLAND motorists were the guests this week of the Boston Automobile Dealers' Association at a closed motor car week held in Boston. It was the first exhibition of its kind held in the East and presented many novel features. The exhibits were not housed under one roof, but each of the 100 dealers in Boston held individual displays of their enclosed models at their show rooms, the latter being especially decorated for the occasion with bunting, extra lighting effects and floral settings.

Many of the dealers, in addition to the complete line of enclosed types, exhibited special jobs embodying new features, refinements and improvements that proved of great interest to those who enjoy their cars the year around. Over 30,000 invitations were sent out and there was a l'beral response. In addition to dealers from all parts of New England many motorists made special trips to the city to inspect the many models of winter cars. Motorists soon learn that with the enclosed body they can enjoy the fall and winter motoring without experiencing any discomforts from the weather. The majority, however, have been slow to apreciate the advantages of the enclosed car or convertible type, and as an educational measure toward appraising the public of the value of this type of car the Boston dealers staged their show.

Very appropriate settings were employed by many dealers to give a seasonal tinge to their display, one exhibitor using his display window for a winter sporting scene, showing a party of tourists camped in the woods, and another showing a party out on a sporting trip

with skates, snow shoes, skis, toboggans set about, giving a realistic touch to the setting, while a convertible sedan in the background immediately suggested the refuge and comfort to be obtained from the cold whenever the party should turn homeward.

This exhibition was in the Overland and Willys-Knight agency. An autumnal atmosphere was produced in other stores through the use of fresh cut branches from oak trees, the leaves having taken on their multicolored dress, and created a beautiful background for the cars. In the Boston Buick company the full line of Buick enclosed cars was shown in an autumnal garden. The Hinchcliffe Motor Car Co., Kissel Kar agents, opened their All-Year Car Show on Saturday, at the close of the week with the sedanlet as the feature of the All-Year Kissels.

In the Pierce-Arrow closed car line shown at the J. W. Maguire company, the motorist saw the last thing in body luxury, and the coach builders are exemplified in its highest form, as well as sump; tuous equipment and fittings. The Pierce-Arrow company for almost as many years as the motor industry has been alive, have specialized in luxurious enclosed bodies, and while they developed a very perfect type many years ago, each year their designers are able to add or alter some little fitting that has worked toward a perfection of the car.

At the sales rooms in the big Packard plant on Commonwealth avenue the most conspicuous exhibit in the complete line of enclosed body types, was a special job town cabriolet model. The interior is upholstered in Chace tapestry of Kentucky

rose design and the fittings include a toilet case, cigar lighter, mirror, dome lights and audophone, which enables the occupants to communicate with the chauffeur by speaking in a natural tone and without raising a transmitter to the

In looking over the 500 odd models of enclosed cars on display at the different dealers' show rooms, one is convinced. contrary to general expectations, however, that this type of car is not alone for the wealthy or rich man, but is a convenience within reach of the average motorist. Another striking feature also is that the moderate priced enclosed cars have all the essential points making for comfort as are embodied in the high priced cars.

At the Jackson Motor Car Co. the latest Jackson body creation for 1918 was on display. It is fitted to the new type "eight" chassis and has many distinctive features which make it exclusive in its class. The bood is high and has a graceful contour and the construction is of the highest class of coach work, while the exterior and interior finish is equal of that on the most expensive cars.

attractive exhibits Other included those of the Marmon at F. E. Wing's: the Stearns at the J. H. MacAlman show rooms: Oldsmobile all-season cars shown by the Oldsmobile company of New England; Paige-Detroit by the Paige-Detroit company of New England: Nash cars by C. P. Rockwell; Reo by J. M. Linscott; Elgin Six by the Bryant G. Smith & Sons Co.; Scripps-Booth by Scripps-Booth Motor Car Co., and the Haynes by the W. L. Russell company.



Three Per Cent War Tax on Automobile Industry

THE War Revenue Bill was signed by President Wilson on Wednesday, October 3. Its most important relation to the interests of the motor car industry and motorists is contained in the provision for a 3 per cent. tax on all motor vehicles, including trucks, payable by manufacturers, producers and importers. This tax it is understood will be levied against the amount the maker receives for his product, and automatically went into effect the day after it was signed

Aifred Reeves, General Manager of the National Automobile Chamber of Commerce, in a special bulletin explaining the provisions of the bill, says that our Congressmen and Senators at Washington will find that the automobile industry will patriotically assume the excess burden that has been placed upon it and continue to co-operate with the government authorities in doing everything it can to help in the present national crisis.

The interpretation placed upon the sections of the bill covering the tax on automobiles is that there shall not be a tax on cars held by retailers but that on cars held by wholesalers at the time the bill becomes a law, there shall be paid a tax of 1½ per cent. (being one half of three per cent. tax). This tax shall be paid by the wholesaler so holding such article. It probably will not include second hand cars.

The manufacturer may deduct 5 per cent. of the amount paid for the tires from the amount of tax paid on each vehicle, including the inner tubes on such vehicles.

While the tax does not apply to cars that have been bought and paid for by dealers, the 1½ per cent, rate is charged against the wholesaler on the cars which he has on hand at the time the law went into effect.

As the method of collecting the tavation works out, the seller collects the amount of the tax from the dealer and makes monthly returns to the United States.

Mr. Reeves is of the opinion that cars or trucks sold to the United States Government will be exempt from the tax, or if not, the tax can be added and returned through the Revenue Office. In the case of the automobiles sold to our allies, the tax will have to be added to the regular price and paid by such foreign governments.

Following are the sections of the War Revenue Bill affecting the automobile industry:

TITLE VI.—WAR EXCISE TAXES,

Section 600.—That there shall be levied, assessed, collected and paid

(a) Upon all automobiles, automobile trucks, automobile wagons, and motorcycles sold by the manufacturer, producer, or importer, a tax equivalent to 3 per centum of the price for which so sold:

From the tax which otherwise would be imposed upon a manufacturer, producer, or importer of automobiles, automobile trucks, automobile wagons, or motorcycles there shall be deducted an amount equivalent to 5 per centum of the amount paid for the tires, including inner tubes, on such vehicles by such manufacturer, producer, or importer;

Section 803.—That each manufacturer, producer, or importer of the articles enumerated in section six hundred and one (Sporting Goods division) shall make monthly returns under oath in duplicate and pay the taxes imposed on such articles by this title to the collector of internal revenue for the district in which is located the principal place of business.

Such returns shall contain such information and be made at such times and in such manner as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may by regulations prescribe.

That upon all articles enumerated in subdivisions above which on the day this act was passed are held and intended for sale by any person, corporation, partnership or association other than a retailer who is not also a wholesaler or the manufacturer, producer, or importer thereof there shall be levied, assessed, collected and paid a tax equivalent to one-half of the tax imposed by each such subdivision upon the scale of the articles therein enumerated. This tax shall be paid by the person, corporation, partnership or association so holding such articles.

association so holding such articles.

The taxes imposed by this section shall be assessed, collected, and paid in the same manner as provided in Section 1002 in the case of additional taxes upon articles upon which the tax imposed by existing law has been paid.

Nothing in this section shall be construed to impose a tax upon articles sold and delivered prior to May 9th, 1917, where the title is reserved in the vendor as security for the payment of the purchase money.

TITLE X.—ADMINISTRATIVE PROVISIONS,

Section 1607.—That (a) if any person, corporation, partnership, or association has prior to May ninth, nineteen hundred and seventeen, made a bona fide contract with a dealer for the sale, after the tax takes effect, of any article upon which a tax is imposed under Title III, IV, VI, (covering tax on Automobiles) or IX, or under subdivision fourteen of Schedule A of Title VIII, or under this section, and ib) if such contract does not permit the adding of the whole of such tax to the amount to be paid under such contract, then the vendee shall, in lieu of the vendor, pay so much of such tax as is not so permitted to be added to the contract price.

The taxes payable by the vendee under this section shall be paid by the vendor at the time the sale is consummated, and collected, returned and paid to the United States by such vendor in the same manner as provided in section five hundred and

The term "dealer" as used in this section includes a vendee who purchases any article with intent to use it in the manufacture or production of another article intended for sale.

Section 1002.—That where additional taxes are imposed by this Act upon articles or commodities, upon which the tax imposed by existing law has been paid, the person, corporation, partnership or association required by this act to pay the tax shall, within thirty days after its passage, make return under oath in such form and under such regulations as the Commissioner of Internal Revenue with the approval of the Secretary of the Treasury shall prescribe. Payment of the tax shown to be due may be extended to a date not exceeding seven months from the passage of this Act, upon the filing of a bond for payment in such form and amount and with such sureties as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may prescribe.

MEETINGS.

War Camp Recreation.

John N. Willys, president of the Willys-Overland Company has been appointed chairman of the National Committee on War Camp Community Recreation.

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RACING CONTESTS.

Chicago, III., master driversOct. 11-12	-13
Richmond, Va., track raceOct.	13
Chicago, Ill., speedway raceOct.	13
New York, speedway raceOct.	27
Columbus, O., Dixie tourOct.	24

SHOW CALENDAR.

Boston, Mass., closed car show. Oct. 6-13
Cincinnati, O., dealers' show. Oct. 6-13
Dallas, Tex., Automobile and Accessory
Dealers' AssociationOct. 13-28
Syracuse, N. Y., first annual used car
showOct. 22-26
Worcester, Mass., show auspices United
Shows CoOct. 22-29
Denver, Col., automobile show. Nov. 12-18
Los Angeles, Cal., automobiles and ac-
cessories show
Springfield, Mass., show auspices
United Shows CoDec. 3-9













Driving A New Car to Death



W ILL FIXIT usually has an idea for a story when I drop in to see him and yesterday was no exception. "If you are a member of the Society for the Suppression of Cruelty to Automobiles you will realize how I feel when I say that my ire is aroused against some of the present day car abusers," said William, as I took my seat on a convenient box.

"Take a perfectly new and good car and put it into one of those same 'maniacs' hands and he will drive it to death within a month if he lives that long himself. Tommy Harrington is just one of that sort and he keeps me worried to death most of the time, not for his neck, but for my reputation.

"I suppose you wonder just what I mean by this statement? Well, let me tell you. Tommy is a good boy, truthful, and everyone is his friend, but he is the most reckless fellow with an automobile that I ever saw. He knows machinery from A to Z, but has absolutely no respect for his own automobiles.

"I have seen him take an automobile that was ready for the scrap heap, work on it for about a month and then win a 'free-for-all' contest. For automobile knowledge he has a greater reputation than I, even if I am a repair man, and I guess he deserves it.

"In the past six years Tommy has owned eight different makes of machines, and it is interesting to note that not one of the eight makes of cars is popular in this village. Tommy's opinion is so regarded that the prospective car buyer is very apt to be led by Tommy's judgment.

"Tommy expects too much of his cars and when the car fails then he condemns the machine. That's just what I am afraid of now. He is looking at one of my cars and I am afraid that he will buy it. As soon as the car falls down, bang goes my agency in the town. I won't be able to give a car away, much less sell one.

"I only wish that the people realized that nearly all of the present day cars are good in every sense of the word. One car may have one or two little selling points that the agent can enlarge upon, but at the same time another will have many balancing features.

"Every automobile manufacturer stakes his reputation upon his car. He isn't going to market a machine that he knows is mechanically weak. Before he puts the car on the market his whole staff of engineers go over every part, check over bearing and shaft sizes, test the material and decide upon the best design.

"Of course I think that the car I am selling is the 'best,' because I have looked up all of its good points, but I don't doubt that I could find another car just as good if I cared to. It is just such people as Tommy that keep the prospective customers 'on the bench' so to speak. The average person knows so little about a car that he is afraid to buy one because of the possibilities of great expense and the chances of getting a poor car.

"It usually takes about a year to convince this kind of person that he is misp-

ing a great deal of happiness in depriving himself of an automobile. Should a "Tommy Harrington" talk with him chances are that he will hesitate even longer. Our only hope is to close with him first and save him much trouble and worry."

Automobiles Exempt From Export License.

The Exports Administrative Board of the government has issued a list of articles which do not require an export license at present except when shipped to Albania, Austria-Hungary, that portion of Belgium occupied by the military forces of Germany, Bulgaria, Denmark, her colonies, possessions, or protectorates; Germany, her colonies, possessions or protectorates; Greece, Leichtenstein, Luxembourg, the Kingdom of the Netherlands, Norway, Spain, her colonies, possessions, or protectorates; Sweeden, Switzerland, or Turkey (excluding any portion of the foregoing occupied by the military forces of the United States, of the Nations associated with the United States in the war), or any territory occupied by the military forces of Germany or her allies.

Automobiles and parts are included in this list and specific mention is also made of the following articles used by motorists: ball bearings, jacks, lamps, metal valves, radiators, rubber, rubber cement, screws, screw drivers, speedometers, spark plugs, spokes, sprockets, trailers, trucks, ratchets, and wrenches.

States in License Race.

The states of Ohio, California and Iowa are running a close race in the number of automobile licenses issued to date, standing recently in the order named with 320,000, 268,096 and 262,772 respectively. Ohio has already issued more licenses than for the entire year of 1916, when only 247,807 gasoline cars were licensed. California issued 250,660 licenses in 1916. Iowa has a motor car for every ten persons of its population

Convicts on Missouri Roads.

The State of Missouri is making arrangements under which the various counties will employ convicts on highway construction. Convicts will work under the direct supervision of the state highway department and the counties will pay the state for their work a sum not exceeding \$1.50 a day per man including the food, lodging and guarding.

FOOD PLEDGE

(From The Automobile Journal.)

TO THE UNITED STATES FOOD ADMINISTRATION, WASHINGTON, D. C.

I am gind to join you in the service of food conservation for our nation, and I hereby accept membership in the United States Food Administration, piedging myself to carry out the directions and advice of the Food Administrator in my home, in so far as my circumstances permit.

Number in household......Occupation of breadwinner.
Will you take part in authorized neighborhood movements for food conserva-

Have you a gardenf.

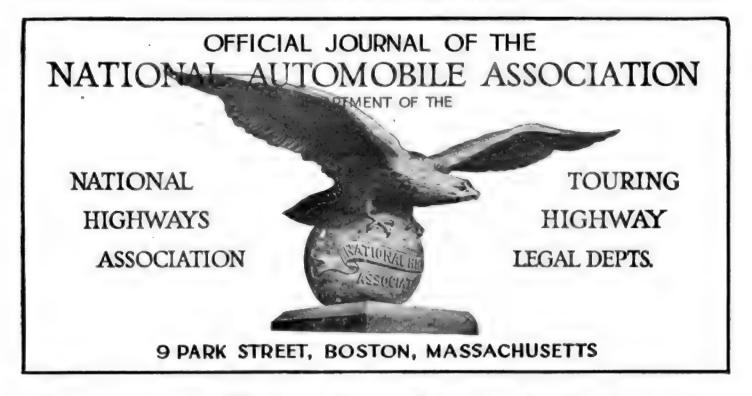
There are no fees or dues to be paid. The Food Administration wishes to have as members all of those actually handling food in the home., All women over 16 are eligible.

DIRECTIONS.

Cut this out and mult it as your piedge card to the Food Administrator, Washington, D. C., and you will receive free your first instructions and a house-hold tag to be house in your window.

If you want the button of the Food Administration, send 10 cents and a return addressed envelope. The shield insignia for the sleeve of the uniform will be sent with the button if you ask for it.

(Remember Food Pledge Week, Beginning Oct. 21.)



Suggesting Wider New England Reciprocity

E recently had occasion to note, and with pleasure, that the Commissioner of Motor Vehicles of Connecticut contemplated entering into reciprocal agreements with the authorities of other New England States for the purpose of properly handling drunken, reckless and indifferent drivers of automobiles upon the highways. This is an excellent attempt to rid the highways of a class of users who are not only a menace to other users but to themselves as well. Reciprocity having been deemed a good political and commercial expedient before, there is no good reason whatever why reciprocal arrangements between the States in dealing with motor vehicles and their operators might not also develop into a splendid and beneficent system, if not for the whole country at least for New England.

But why stop at the proper handling of drunken or reckless operators? Why not go further? Why not arrange for reciprocal benefits as well as for reciprocal punishments? New England is but a small place, geopraphically speaking. Motorists may traverse the highways of all six of the New England States in a single day. In this single day they may also be subject to the statute laws of these half dozen states as well as to the local regulations of scores of cities and towns. The motor car owner and the motor car operator, eliminating for the moment the enormous commercial and other aspects of the business, are entitled to some consideration beyond the exaction of fees and taxes and the meting out of punishments. We therefore suggest a few improvements that might be brought about in the near future through reciprocity or through the committee of the New EngAUTOMOBILE HEADLIGHTS.

The Head light laws of the New England and adjacent States are causing so much commotion in the motor world that we deem it advisable to send out a general warning to motorists at once to equip the head lights on their automobiles with some approved dimming device, or to be-dim their head lights by some other means at least to some degree.

The law of New York, Connecticut, Massachusetts, Maine and other States upon the subject substantially provides that lights shall be so adjusted as to prevent dazzling rays and that rays shall be thrown upon the road-way directly ahead of the automobile instead of illuminating the surrounding country as was heretofore the vogue.

land States officials that would prove a great boon to the three hundred thousand motorists of New England.

First—A uniform traffic law, simple, concise, and sensible, for the cities and towns of each New England State.

Second—A New England registration tag or identification plate.

Third—A New England chauffeurs' and operators' license.

Fourth—A uniform signboard for all New England state highways as well as for all cities and towns.

Fifth—A uniform marking of routes by colored bands upon posts, fences, trees, etc., such as is found now, in a more or less uniform degree, in Massachusetts,

New Hampshire, Connecticut, and Rhode Island.

The enactment of laws which would put into operation these five things would be a wonderful improvement over the present method of regulating motor vehicles and their operators in the New England States and might ultimately lead to their adoption by all the States of the Union.

Detroit Don'ts.

The Detroit Automobile Club advises us as follows:

Avoid Loss by Theft.—Bagley Avenue and Woodward and cross streets near the Majestic Theatre are two of the best places in town to have cars, tires and accessories stolen. If you would have your property safe at the theatre, park your car in a conspicuous spot. Avoid Bagley Avenue.

Get New License.—If you should happen to buy a used car, be sure to go to the Secretary of State's office and purchase a new license. The law now provides a penalty for those who use a license issued in another's name.

Watch Your Tail Light. Numerous motorists have been observed of late driving with tail lights out. There is a penalty provided in the traffic ordinance for this, Be careful. You may be summoned into court. Think of the tail light, too, as a preventive of roadway collisions.

Give these the Go-By.—Ypsilanti, Albion and Marshall are operating speed traps. In going to Battle Creek or any other cities along Michigan Avenue, avoid these towns.

LATE DECISIONS IN MOTOR LAW

Insurance Company Must Pay for Depreciation of Automobiles Is a Ruling in Minnesota

N a recent case before the Minnesota Supreme Court it appeared that there was a clause in the insurance policy covering the plaintiffs' car which provided that "the company's liability is limited to the actual intrinsic value of the property damaged or destroyed at the time of its damage or destruction, which shall not be greater than the actual cost of the repair or replacement thereof."

The plaintiff's automobile collided with a car belonging to one, B, and damaged it, under circumstances which rendered the plaintiff liable. The defendant paid the owner of the damaged car the amount of the bill for repairs paid by him. Thereafter B recovered a judgment against the plaintiff for the depreciation in the value of the car caused by the accident over and above the amount paid for repairs. The plaintiff paid this judgment, and brought an action against the insurance company to recover the amount paid B; plus attorney's fees, from the defendant company under the policy.

The question before the court was whether the limitations clause above quoted did not limit the liability of the defendant to the actual cost of the repairs made, when it appeared that the repairs did not and could not make the car as good as it was before the accident; and also whether the plaintiff could not recover the amount of the judgment paid by him for depreciation in the value of the car, with attornev's fees incurred in defending the suit, whether the amount involved was small or not.

Counsel for the plaintiff argued that the policy promised indemnity from liability imposed by law upon the assured for the destruction of or injury to the property of others. And that the limitation clause should be construed liberally so as not to defeat recovery for liability imposed by law for injury to the property of others. It was clear that B's car was injured over and above the cost of the repairs made. It was also clear that the injury could not be remedled by repairs, and it was also clear that the law imposed liability on the plaintiff for injury to B's property. The court said that but for the limitation clause there would be no doubt of the liability of the Was it intended, the court insurer. added, that the limitation clause preclude liability when the insured was compelled to pay for injuries that could not be remedied by mechanical renairs? Is this clause so free from ambiguity that it is necessary so to construe it? To renair an automobile means to restore it to as sound or good state after injury or partial destruction, to restore It to its original condition. "Renlace. ment has much the same meaning; but

as used would seem to refer to cases where property is destroyed rather than merely damaged, where repairs only will not restore it to its original condition. But there are many articles of property which are never again of the same value after injury and repair. It would often be impossible to restore a damaged article to its original condition by repairing it. It was not possible to make B's car as good as it was before it was damaged. Yet all was done that was possible to this end without buying him a new car. The court, (or rather a majority of it), were of opinion that the clause providing that the liability of the insurer was limited to the actual value of the property damaged or destroyed; "which shall not be greater than the actual cost of repair or replacement thereof," was too narrow a construction of the language of the limitation clause; that there are damages to property that are not and cannot be fully remedied by repairing them, and that there is a liability for the full loss, limited, of course, by money limit specified.

Held that judgment should be entered for the plaintiff for the amount claimed.

Settlement Contract Terminating Policy Rights.

An automobile became disabled on a highway in the State of New York and the next day the automobile was burned. An action was brought by the owner on a policy of insurance to recover for the loss resulting therefrom. Upon a trial of the action the complaint was dismissed at the close of the case. Upon appeal from the judgment entered thereon the Appellate Division reversed the judgment and granted a new trial. From such order and judgment the defendant appealed to the Court of Appeals.

It appeared to the Court of Appeals that the plaintiff's automobile, insured by the defendant for \$2,500, was burned, and that the plaintiff filed a claim for total loss, which the defendant disnuted. The defendant company then offered to settle the claim for \$2,000, or to ship the car away for repairs. The plaintiff elected to accept the proposition for repairs, stating that the defendant must make the car as good as before the fire. and not to delay too long. The defendant then wrote plaintiff that it had made arrangements to shin the car away and would require about four weeks to make the rensira.

And the Court held that a settlement contract arose, terminating all rights under the nolicy contract: so that the only remedy therefor was for a breach of the new contract.

POLICE ACTIVITIES IN NEW ENGLAND.

During the fall touring the police authorities of the New England States seem to be dominated by a penchant to rigidly enforce the motor vehicle laws and traffic regulations. This is not an impromptu effort, but a regular fall harvesting. Therefore, we deem it advisable to call tourists attention to the fact that traps have been operated in the following named localities during the present motoring season and are likely to be during the next two months, as a reminder to the motorists that the police are still "on the job."

Massachusetts.

Boston—Metropolitan Parks and Parkways, Beacon Street from Arlington to Massachusetts Avenue, Columbus Avenue from Massachusetts Avenue to Roxbury Crossing, Massachusetts Avenue in the vicinity of the Edison Buildings, Tremont Street from Park to Boylston Streets, Park Square and vicinity.

East Boston-Saratoga Street, near Austin; at Brooks and Chelsea Streets.

Besides operating traps in the above named places the police are making many arrests for leaving cars in the streets unattended beyond the time allowed by the traffic regulations of Boston, and for not sounding horns at corners and intersecting ways.

Cambridge—On Massachusetts Avenue, In the vicinity of Harvard Square; also on Massachusetts Avenue at Prospect Street; and on Brattle Street and Magazine Street.

Springfield—The entire length of the Main Street.

Worcester-Shrewsbury Street.

Arlington—On Massachusetts Avenue from the Soldiers' Monument to Arlington Heights.

Nahant-On the State Highway between Lynn and Nahant.

Northboro-On the main State Highway running through Northboro to Worcester.

Westboro, Concord, Blackstone, Southbridge and Concord.

Brockton-On Main Street, West Elm Street and Warren Avenue.

Assonet, in Fall River, Reading, on the Andover Turnpike, Ipswich, Norwood, near the Norfolk Hospital, South Hadley, Sandwich, Quincy and Plymouth.

The laws prohibiting dazzling headlights on automobiles and the approach of motor vehicles nearer than eight feet to a street car stopped to take on or let off passengers is being rigidly enforced throughout the Commonwealth.

New Hampshire.

Concord, Keene, Laconia,

Manchester—On the bonlevard from-Manchester to Massebesic Lake. And onthe Hanover Street Boulevard and Candia Road.

Merrimac. Nashua. Somersworth.

Rhode Island.

Providence. East Providence. Pawtucket—On West Avenue, Mineral Spring Avenue and Broad Street; Main Street, after passing square, also on Broadway.

Woonsocket.

Riverside—In Pawtucket Avenue and on Bullock's Point.

Newport.

Cumberland-On Broad Street.

Wakefield, Peace Dale, and South Kingston.

Westerly.

Narragansett Pier.

Maine.

Between Biddeford and Portland.

Portland—In entering the city on the main road from Boston.

Dexter, Auburn, South Portland, Gray, Scarboro.

And between Portland and Poland Springs, near Dry Mills and Rockland.

Connecticut.

Hartford and East Hartford—Especially on Farmington Avenue, Hartford.

North Haven and Wallingford, and between North Haven and Meriden.

New London.

New Haven—between Howard and Kimberly Avenues.

Stamford, Willimantic.

In Massachusetts.

East Boston—The police of the city are continuing to arrest motorists for overspeeding and for not slowing down and not blowing their horns at Brooks and Chelsea Streets and on Saratoga Street, near Austin Street; and little or no leinency is shown to offenders.

Boston—A new ruling by the Metropolitan Park Commissioners provides that an officer is not required to ask a motorist for his license unless he is to be summoned into court or arrested on another charge. The Commissioners directs that the person is not to be arrested but summoned into court.

Cambridge—Police officers stationed at Massachusetts Avenue and Prospect Street are haling into court motorists who fail to act at his signal.

Brookfield--Complaint still persists against overspeeding motorists on Central Street in this town.

In New Hampshire.

Somersworth—Motorists overspeeding through this town are being prosecuted. In some instances overspeeders are charged with recklessly operating.

Keene—The State Motor Vehicle Dept. is taking a hand in the prosecution of overspeeding motorists. Drivers have been haled into court not only for overspeeding in the built up sections of cities and towns but also for exceeding the 25 mile limit in the open country.

Authority of Drivers of Trucks.

The driver of a truck used by a mercantile company in deliveries of its goods invited a lady acquaintance to ride on the step on the car, and in the course of the ride she was injured. The driver had no authority to invite persons to ride on the truck. The Court held the driver was not acting within the scope of his judgment; master not liable.

SOME SOUTHWARD MOTOR TOURS

From New England Shore Across Long Island—and Then Through Princeton into Philadelphia

These are the days when the motorist hies himself southward, and it is possible, therefore, that autoists may find a suggestion of value in some one of the four following motor tours.

New London to New York City via Greenport and Port Jefferson.

Fair gravel roads and good macadam.

Take steamer at foot of State St. to
cross Long Island Sound to Greenport.

0.0 GREENPORT. Through Main and Front Sts., over Hashamonuck Pond. into

4.9 SOUTHOLD. Continue straight ahead through Peconic (8.1M) Cutchogue (9.9M), Mattituck (12.9M) taking left fork and over RR., passing Laurel P. O. (15.4M) through Aquebogue, passing Jamesport P. O. on left, into Main St., into

22.4 RIVERHEAD, Through Main St., passing fountain and over RR., bearing right, at 24.9M, thence into

33.2 WADING RIVER. Through town, and bear left around over RR., twice into and through Miller Place (41.9M). Continue through town, bearing left into Main St., into

46.6 PORT JEFFERSON. Through
Jones St., bear left, into Broadway, and along the harbor and
up winding grade, into East Setauket (48.4M). One mile beyond
at 4-corners, left, passing Stony
Brook Depot, into

51.9 STONY BROOK. Bear left and through town, right, upgrade, and 1½ Miles beyond take left fork through St. James (54.2M), over. RR., bearing right, and over bridge into Smithtown (57.9M). Left under RR., then straight into Commack (62.5M), through town, turning right at 4-corners, into

66.4 NORTHPORT. Cross RR., passing Larkfield P. O., joining trolley and bearing left, skirting Northport Bay, bear right, then left, through Centreport (69.6M), through Main St. into

72.9 HUNTINGTON. Continue through town, through West Main St., and at fork ¼ mile beyond bear left, passing Cold Spring P. O. on right, over concrete bridge, passing Fish Commission Station, bearing upgrade, into

79.9 EAST NORWICH. Continue through town, and 5 miles beyond, bear right over RR., through winding road, into

86.5 ROSLYN. Beyond Inn, right, meet and follow trolley, then left, through Manhasset Hills, (89.9M) and at road's end, left, and bear left through Little Neck, (92.0M), bear left and over Alley Creek, through

94.0 BAYSIDE. Bear right over RR., through Broadway, into

97.5 FLUSHING. Through Main St., trolley, hridge meet OVER Flushing Creek, over straight ahead for about one mile, and bear left into "Shell Road." Through Corona, (99.4M) crossing Junction Ave. trolley and Broadway trolley, through Winfield on Thomson Ave., over RR. viaduct, into Jackson Ave., to Queensboro Bridge, into

103.7 LONG ISLAND CITY. Over Queensboro Bridge, into

105.0 NEW YORK CITY.

New York to Philadelphia via Princeton and Trenton.

0.0 NEW YORK. West 42nd St. to
Weehawken Ferry; leaving ferry
boat left and right up grade into
Boulevard, right into 3rd St., over
Bergen Line Ave. trolley, at the
end of the road, near cemetery,
left into Hudson County Boulevard, over trolley into

6.4 JERSEY CITY. Right into parkway, through West Side Park, and at road's end, left meeting trolley, bearing right on Communipaw Ave., over bridge, over Hackinste into Plank Road, following trolley over Passaic River, under RR. and following trolley over RR., through fork, bearing left into Ferry St., under RR., into Polk St., right into LaFayette St., under RR. into

12.0 NEWARK, N. J. Through Broad St. and LaFayette St., following trolley into Broad St., bearing right into Clinton Ave., into Astor St., into Frelinghuysen Ave., over and under RR.'s, bearing left into Newark Ave., near Waverly Park Depot, into

17.0 ELIZABETH. Through No. Broad St., into Westfield Ave., over trolley, bearing left into Cherry St., over RR. bridge, and at end of the road, right, into Rahway Ave., over RR., through St. Georges

Ave. Into

22.7 RAHWAY. Straight ahead through the village, passing on the left, the Colonial Club House and at the end of the road, right, then, left, taking the left-hand road, passing Iselin Depot, right, passing Menio Park Depot, and at end of the road, right, under RR., then left, into















Providing Gasoline for the Allies and Us

Address Delivered at the War Convention of American Business Men. Held Under the Auspices of the National Chamber of Commerce at Atlantic City, N. J. in Month of September 1917

> By A. C. BEDFORD President, Standard Oil Company

NDER the general heading, "How American Industry Can Help Win This War," the topic assigned to me is "Priority and Distribution." matter of distribution, of course, involves supply and conservation. I can

speak on any such topics only in so far as they include affairs within my own experience. Perhaps a statement of the concrete experience and problems of the industry with which I am identified may have lessons which will prove illuminating to other industries.

The fundamental problem confronting the petroleum industry is that of supply. Next to an ample quantity of munitions of war and food, nothing, with the possible exception of coal, is so absolutely vital to winning this war as petroleum and petroleum products.

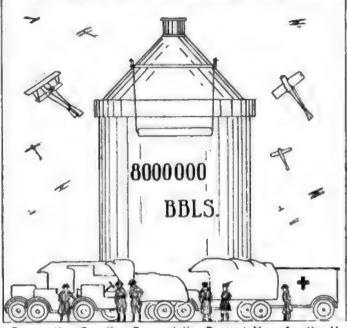
They tell us the war is to be worn in the air. Our country is said to be building large numbers of aeroplanes. Our Allies are building flying machines as fast as they know how. Vital to the very existence of these aeroplanes is the highest grade of gasoline

We are to send great armies to Europe to supplement those of our Allies. They

which can be produced. Four Tons of Material to Every Soldier.

WHY TO SAVE GASOLINE.

Saving gasoline is something the motorist wishes most heartily to do because it will be "doing a bit" toward winning the war and because such conservation is vital to the continuance of motoring privileges. Why to conserve gasoline is told in Mr. Bedford's paper, an expert discussion revealing graphically consumption's enormous pressure on production, presented herewith, but slightly abridged in form as it was presented before the war convention of business men. How to save gasoline is presented to the motorist In brief, concise instructions on this same page, and a constant reminder in similar terms to do so is being put in every service garage in the country by the National Automobile Chamber of Commerce. say that four tons of material must be shipped for every soldier transported. In France most of the transportation must be done by motor lorries. our army is fully equipped, some 35,000 motor lorries will be required. These



Gasoline Demand the Present Year for the Use of Our Allies in Europe.

will require gasoline and lubricating oil in large quantities.

Our Government is building at the greatest possible speed merchant ships and men-of-war. We have appropriated hundreds of millions of dollars for the gigantic task before us. These ships will call for fuel oil, lubricating oil and gasoline to an extent beyond any precedent.

To protect our coast against submarines, our navy has created a Mosquito Fleet, consisting in a large measure of motor-boats. There are thousands of motor-boats operated in American waters, although, of course, not all are for purposes of national defense. The operation of every such vessel, whether for pleasure or for strategic purposes, calls for a continuous supply of gasoline and other petroleum products.

Our Allies, too, are calling for oil in al its forms in ever-increasing quantities. In 1915 this country exported about 5,000,000 barrels of gasoline, whereas in 1916, 7,120,000 barrels were sent abroad.

Munition cars, ambulances and selfmoving vehicles of every kind are increasing daily in the theatre of war, and the prospect is that the present year will call for 8,000,000 barrels of gasoline for the use of our Allies in Europe.

What Allies Expect of Us. Our Allies also look to us for the bulk of their supply of fuel oil, and petrol-

eum products of every form for the use of their merchant ships, their navies and their armies. With the Galician and Roumanian oil fields in Europe in the hands of the Central Powers, and with the available supply of Mexican oil reduced by reason of the shortage of shipping tonnage, the United States is the largest and nearest source of supply for the oil in all its forms, which is so absolutely necessary to win this war.

I have given some indication of the needs of our own government and our Allies for petroleum and petroleum products necessary in the actual conduct of warfare. Many of these uses are entirely or relatively new; others are upon a scale hitherto undreamed of. Certain it is that all of them call for an ever increasing supply of petroleum.

And the demand for troleum and petroleum prodcon-

ucts not alone is the actual of the war. Up to relatively a few years ago, the chief use

HOW TO SAVE GASOLINE.

Don't allow your engine to run while the car is standing.

Coast down the hills, thus saving both engine and gasoline.

Keep the carburetor adjusted; cut the adjustment as low as pos-

Watch the fuel line: don't let it leak.

Don't use gasoline for cleaning; use kerosene or alcohol.

Keep the cylinders clean, thus saving fuel and obtaining power.

Don't fill the tank too full, so that gasoline will waste by spill-

Save gas and the car by changing gears rather than climbing a hill with the throttle open.

Tires fully inflated are an economy; soft tires consume power.

of petroleum was for kerosene and lubricating oil. With the development of the internal combustion engine and its adaptation to the automobile, we found an entirely new use for gasoline, which, up to that time, had been considered an unimportant byproduct of crude petroleum. Now it has come about that the chief value of petroleum consists in its gasoline content, and while England and our Allies are calling in loud tones for more ships, and more ships, the world of warfare, of trade, and of pleasure, are calling in ever-higher tones for more gasoline and more gasoline.

The Automobile Giant,

The increase in the number of automobiles manufactured in the United States has been little less than miraculous. In 1899 there were 10,000 motors in this country. In 1905, only 85,000 cars. Yet by 1914 there had come to be 1,253,854 cars, and by the 1st of July of this year, approximately 4,000,000. The production of gasoline brought about by this extraordinary demand, jumped from about 6,000,000 barrels in 1899 to some 45,000,000 barrels in 1916, and will probably be over 50,000,000 barrels in 1917.

duty of every one of us to consider carefully. The figures available for the first six months of this year show that the rate of production of crude oil indicates a total production for the year of 312,000,000 barrels, whereas consumption was going on at a rate of approximately 320,000,000 barrels for the year.

On the 1st of January, the amount of petroleum in storage in the United States was 174,370,500 barrels, whereas on July 1st, 164,590,942 barrels were in storage—a reduction of 9,779,558 barrels. This reduction is, however, largely in California stocks, in which state the situation is serious.

It will thus appear that with the stocks above ground and given the present rate of production and consumption, the supply is sufficient to insure our having enough oil for at least the next five years—provided the production is fairly maintained. So while the occasion is not one for alarm, it is one for taking intelligent measures toward adequate production of what we need. Such is the situation confronting the Petroleum Committee appointed by the Council of National Defense, to co-operate with the

the situation confronting the Petroleum Committee appointed by the Council of National Defense, to co-operate with the

Increase of Automobiles in the United States from 10,000 to 4,000,000 Almost Miraculous.

1917

1914

1905

1809(2

In addition to all the demands for gasoline, there has been a great call for petroleum for fuel oil, for road-making, for use in farm tractors, and for use in small farm engines. Every part of the oil is being put to some useful purpose, and the value of the by-products is increasing day by day.

In response to the demands thus created, there has been tremendous development in the production of crude oil in this country. The consumption of crude in 1904 was 117,000,000; it rose steadily to 324,000,000 barrels in 1916. For several years prior to 1916, the production of petroleum in this country had been in excess of the consumption. In 1916, whereas over 308 000 000 barrels of crude oil were produced in the United States. the consumption amounted to over 324,-000,000 barrels of crude oil of American production. In addition to this 324,000, 000 harrels, we absorbed in this country 23,000 000 barrels of Mexican crude.

Consumption Exceeds Production.

The flevres for the first six months of the present year are highly iluminating, and present a picture which it is the Government in meeting its oil require-

This Committee, which is composed of men active in the production and refining of petroleum, has addressed itself wholeheartedly and unselfishly toward the work committed to it.

Petroleum Committee's Work.

The supreme problem which has confronted our Committee in its efforts to serve the Government has been the problem of supply. The oil industry is distinguished from the coal and many other industries in that the problem of supply does not depend upon the present facilities for manufacturing or transporting. Figures compiled a year ago showed that there were 302 refineries in this country, with a daily capacity of 1,043 245 barrels of crude. The refining capacity of the country was increased by 50 per cent. in 1915 and 1916, and at least fifty new refineries were projected at the time the figures above named were compiled. The oil refining canacity of the country is indeed greater than the present demand.

The situation in a word is this: The country is producing oil at the present

time at a rate of about 312,000,000 barrels annually; it is consuming it at the rate of over 330,000,000 barrels; and the refining capacity is upwards of 350,000,-000 barrels. The pipe line and other transportation facilities now existing and in the process of construction are reasonably ample to take care of the situation.

The refiners not only have increased their capacity to take care, by existing processes, of crude production to supply existing demand, but they have employed the most expert talent in efforts to extract from crude petroleum gasoline and other products which are most in demand. Had it not been for the introduction of the "cracking process," invented by Dr. Wm. M. Burton of the Standard Oil Company of Indiana, and other similar processes, the supply of gasoline would long ago have fallen far short of the actual requirements.

Great progess has also been made under pressure of necessity and enterprise, in producing gasoline from the casinghead gas and natural gas. This year approximately 2,500,000 barrels of gasoline will probably be obtained from this source, with more probably, next year.

55,000,000 Barrels Next Year's Need.

But when all has been accounted for, the fact remains that this country will next year require at least 55,000,000 barrels of gasoline, and that amount simply cannot be obtained from the quantity of crude petroleum now being produced.

The fundamental and vital problem confronting the petroleum industry to-day, is to increase the production of crude oil.

Here, then, are the broad outlines of our problem:

What should be borne in mind is that petroleum products, and particularly gasoline, while vitally essential to the uses of war, also have other uses intimately related to the comfort and satisfaction of our daily lives. It can be said easily that we could get along without the automobile. The same could be said of the telephone. But we know that without these instruments of civilization, the horizon of our life would be greatly reduced, and much of the efficiency and happiness of our civilization would be curtailed. The automobile has come tobe not a mere article of luxury to the rich man, it has come to be a necessity to the merchant and the manufacturer in the cities, to the farmer on the plains, and to the miner in the mountains. Theautomobile industry has become one of our great national assets, contributing enormously to the progress of civilization itself.

No Crimping of Automobiles.

It would be a great misfortune if any policy would be adopted or any procedure taken, not absolutely necessary for the successful conduct of the war, which would hamper or handican in any way the growth and value of the automobile industry as a manufacturing enterprise, of the successful and efficient use of the automobiles already in the possession of the nublic. Our national policy therefore should be directed toward pre-

serving as nearly as we can all that we have, and taking care of the needs that are upon us.

It is true that immense economy in the use of gasoline could be effected by present owners of automobiles. There is no reason why everybody should not continue to use motor cars in their business, in movement from farm to village, or even in their pleasures. There is, however, an immense amount of utterly unnecessary use of the automobile which could be curtailed. Likewise, considerable saving could be brought about by more intelligent handling of the automobile engines themselves. The mere matter of letting engines run while cars stand still is a little thing in itself, but in the aggregate it results in an immense waste in gasoline.

The automobile producers of the country also have a great duty to the public to perform, not only in manufacturing the best possible car, but in instructing the users of cars on how to obtain the highest results from their gasoline consumption. Furthermore, there is still a great range of possibility in the invention and improvement of automobile engines in effecting more economical consumption of gasoline.

More Wells, and Then More Wells.

But the great thing to be done, the absolutely necessary thing, is to induce producers of crude oil to make greater and greater effort toward obtaining a large product. The price should be sufficiently attractive to induce more and more people to drill wells, thus insuring a steady supply, and offering always a great pool which will make the whole situation suddenly easy.

We must bear in mind the fundamental difference between the nature of the

problem of stimulating the production of crude oil and that of increasing the output of any other industry which is under the stress of supporting the government in this war. In the oil business the problem is not that of speeding up the production of existing wells; their output is determined by natural conditions and can be affected to a very slight extent by man's efforts.

the oil situation is unique because increased production can only be secured through drilling new wells. New enterprises must be undertaken and new

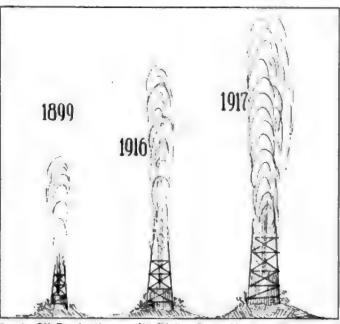
capital enlisted. This is impossible in the face of higher costs and a larger percentage of failures because of dry wells unless the profits to the producer of crude petroleum remain attractive.

Rule of Supply and Demand.

I do not propose any plan whereby there can be a chance of a runaway market price, either for crude oil or for the refined product. But an exceptionally large percentage of refined petroleum products is consumed by those wanting it for use in automobiles and not necessarily to keep themselves alive, as they need coal or food, but because such use is desirable in the rounding out of

one's life and in the promotion of one's business. The law of supply and demand, with reference to this great field, involving the use of the automobile in our daily lives, should therefore, be given reasonable opportunity to operate. Certainly every possible inducement should be held out which it is necessary to hold out to bring forth a greater Increased quantity of crude oil production.

To conclude, let me say that there is not the slightest danger of there being a deficiency either of crude or refined products necessary for the uses of our government, or for the uses of the Allies, in the conduct of this war. America is pro-



Crude Oil Production on its Rising Scale Has Not Kept Pace With the Demands Upon It.

ducing and can produce all that will be needed for these purposes, and I suggest the following policies as ones which should be adopted with references to the subject as a whole.

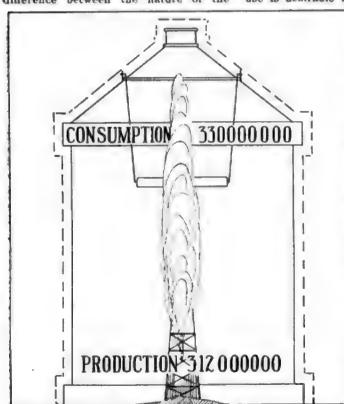
America First; Car Economies.

1. Our Government should receive the first call upon all petroleum produced, either for itself or as it may designate for the use of our Allies in their conduct of this war.

2. The petroleum industry is not, so far as prices go, on a war basis. I mean by that statement to say that the prices are reasonable and fair and no undue advantage has been taken because of either the extraordinary demands due to war conditions or increased costs or shortage of crude. Prices have not materially advanced during the present year in spite of the increasing costs due to increases in wages and high costs of material, and I believe the trade generally will maintain that position, making only such advances in the prices of their products as may be necessary to meet increase in costs of manufacture or material or crude oil.

3. Should, however, there develop a tendency towards the establishment of a runaway price, for instance, for gasoline, it would invite Government regulation of prices.

4. Within these limitations, the law of supply and demand should be permitted to operate freely. There should be a campaign of education of automobile users, showing them how they can obtain the utmost usefulness from their cars with a minimum consumption of gasoline; and above all else, every possible inducement, patriotic, educational, and financial, should be given to the crude oil producers of the country to bring forth from the earth-where plenty of oil is still concealed-all the crude petroleum which may be necessary not only for the conduct of the war, but enough to insure the progress and comfort of our daily lives.



Gasoline Can Empties More Than the Wells Produce—Dotted Line Shows Present Refining Capacity Almost Reached.

PLATE X

GARAGE FOR A SMALL CAR ON THE HOME LOT

By Making Use of Readily Available Material and the Accompanying Design the Handy Man Can Build This One Himself at Low Cost

Designed by the Architectural Department of the Automobile Journal Publishing Co.

THE garage plan presented in this issue is designed for a building to house the small passenger car primarily, although it may be used for larger cars, and its construction is of a character that makes the cost low enough to place it within the reach of every car owner of the thousands who have them. In a word it is a popular garage such as is in great demand.

While inexpensive to erect the building is so designed that it will not detract in any way from the appearance of a place, but on the other hand, if kept in repair and painted should greatly enhance the value of the premises on which it is located. It is solid and substantial and while not of fireproof construction the cost of insuring it is so slight that full protection can be carried and the owner feel the same assurance against loss as if he had invested twice as much in a building of fireproof or semi-fireproof materials.

The building is 12 feet wide and 18 feet long, made entirely of wood with a concrete foundation and floor. The frame is built of 2x4 stude elected on 4x6 sills with 4x4 plates and 2x8 rafters. It is walled in with novelty siding and the roof is boarded in and shingled. There is no work about the structure, in fact, that cannot be done by the man who is handy with tools. The studding and rafters should be of good spruce, the former placed 16 inches off centre and the latter two feet apart. The sills should be of yellow pine. Girts of 2x4 studding placed horizontally every three feet in height between the upright studs should be used to provide the proper stiffness to the frame.

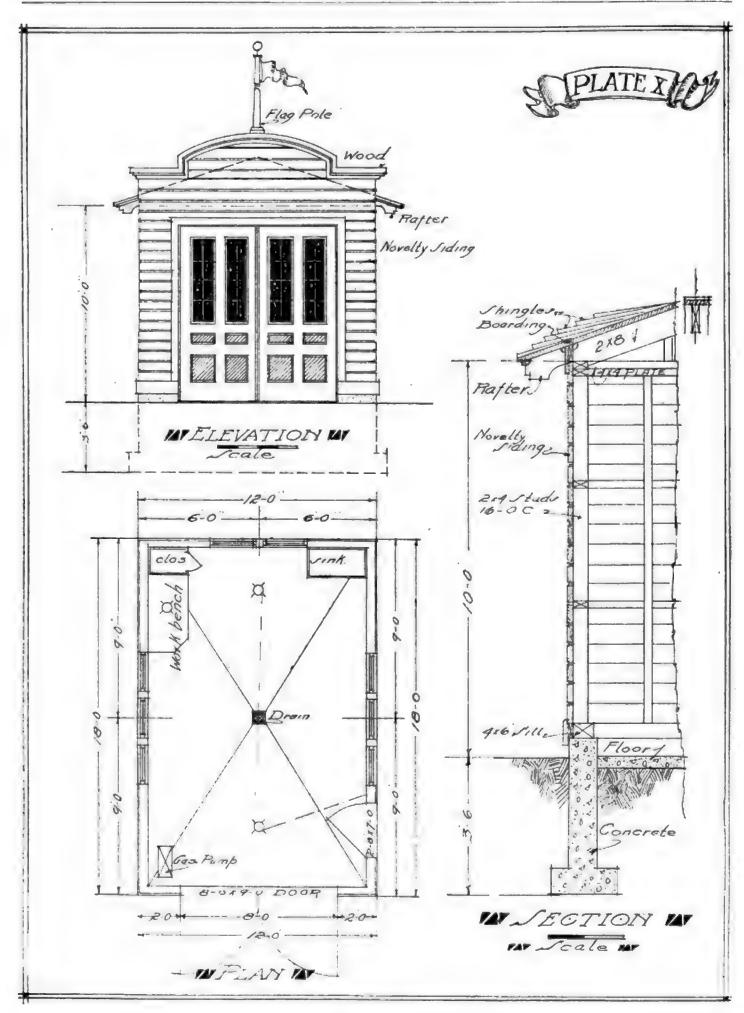
The roof rafters are cut as shown in plan, forming small buckets along the eaves and adding greatly to the appearance of the building, as does also the extension of the front elevation above the roof. A large front entrance, eight feet wide and nine feet high is closed with two swinging doors, paneled, with the upper panels formed of sashes set with eight panes each. This feature is another important point in the appearance of the garage.

There is also a door in the side, so access to the inside may be gained without opening the large doors in winter time and admitting the cold air. Windows may be either of the drop in type or pintled as the owner desires. Sufficient room is provided in the building for a good sized work bench, closet, sink and gas pump. The locations of these installations are shown on the ground plan, together with the centre drain, which is placed in position before the concrete floor is cast. The floor is sloped gently toward the centre to drain off the water when the car is being washed. If the drain is to be connected with the sewer drains provision should be made before the foundations are laid and similar attention should be shown the placing and connection of the gas pump stand with the tank under the ground on the outside.

Foundations should be laid below the frost line, about three feet six inches, and extend above grade to form an underpinning. A lean mixture ter the concrete is sufficient, one part cement, two parts sand and five parts of coarse aggregate providing an amply strong foundation for the size of the building. This mixture would also be suitable for a foundation for the floor, but the surfacing, an inch or more thick, should be composed of one part cement and one part sand.

Practically 30 per cent, of the cost of such a garage is represented in the labor costs. If a man did all or part of his own work the building would stand him in less than \$200. Material sufficient for the structure might be secured for onehalf that amount, in favored localities, by the exercise of cautious buying and care in the selection of timbers for interior unexposed places. A selfbuilder of a commodious and fine garage on the rear of the home lot availed himself of an opportunity to buy for a song recently 30 or 40 concrete blocks taken from a dismantled building. They made a very fine sill course. Another was watching his chance and obtained enough 3x4 inch studding to build his garage at a less cost than if 2x4 inch studding had been bought new. Taken all in all the garage on the home lot is an ever old, ever new proposition. It needs but be tight and snug and its services will be manifold.

The width, depth and clearance of this one car garage is sufficient so that if care were used in driving in through the doors a car of a large touring type could be housed. For the tourabout or small four or five-seater, however, the dimensions and the garage are more serviceable.







Space Drawn for National Automobile Shows

A general meeting of the National Automobile Chamber of Commerce held in New York, Oct. 4, which was attended by representatives of over 100 companies, space was alloted to exhibitors for the two great National Automobile shows to be held in New York and Chicago this winter.

Preparations on the part of the management of the shows as well as the exhibitors is being carried out on a larger scale than heretofore attempted and there is every assurance that the exhibitions will even eclipse the success of the famous shows of the past. The number of exhibitors for both cars and accessories is greater than for any previous show and all the space on the four floors of the Grand Central Palace in New York and the Chicago exhibition buildings will be taken. The New York show will be held during the week of January 5-12 and the Chicago show from January 26 to February 2.

Exhibits will be confined to passenger cars and accessories. The Motor and Accessory Manufacturers have applications to allot space to about 100 of its members, and when final allottment of accessory space is made the total will reach close to 300 for each show.

Manufacturers of the following makes of cars, members of the N. A. C. C., were allotted space at the first drawing for both shows: (gasoline) Abbott, Allen, Apperson, Auburn, Austin, Briscoe. Buick, Cadillac, Case, Chaimers, Chandler, Chevrolet. Cole, Columbia, Crow, Davis, Detroiter, Dodge, Dorris, Dort, Elgin, Elkhart, Empire, Fiat, Franklin. Grant, Glide, Hackett, Hal, Haynes, Hudson, Hupp, Interstate, Jackson, Jordon, King, Kissel, Kline, Lewis, Lexington, Liberty, Marion-Handley, Marmon, Maxwell, McFarlan, Mercer, Mitchell, Moline, Monroe, Moon, Nash, National, Oakland, Olds, Overland, Owen, Packard, Paige, Paterson, Peerless, Pierce-Arrow, Premler, Regal, Reo, Roamer, Saxon, Scripps, Standard, Stearns, Stephens, Studebaker, Stutz, Velie, Westcott, Willys, and Winton; (electrics) Anderson, Baker, Milburn, Ohio, and Wood. The Glide, Dorris, Hackett and Stephens will be shown at Chicago only, while the Kline will be exhibited at New York only.

Space was allotted to the following



G. A. C. Accelerator Foot Rest.

concerns, not members of the N. A. C. C.: American, Harroun, Monitor and Stanley (steam). The American will exhibit at the New York Show only, while the others will be at both shows. Allotment to other non-members will be announced later.

Show Week S. A. E. Meetings.

By arrangements of Meetings Committee of the Society of Automotive Engineers for the Winter meetings of the Society in New York during Automobile Show week and in Chicago during the Chicago show week, the meetings should be of greater importance than previous years.

The New York dinner will be held at Hotel Biltmore, Thursday evening, January 10th. January 10th has been named S. A. E. day for the New York show week. The war dinner of the S. A. E. to be held at Chicago during the Chicago show week will be held at Hotel LaSalle on Friday evening, February 1st. During the day of Friday, February 1st, there will be held a professional session which will largely be devoted to reading of papers on tractor design and other questions relating to the tractor industry.

Kissel Announces Sedanlet.

Sedanlet is the name of a new model announced by the Kissel organization. The cars which bear this catchy title are four and five passenger staggered door models with detachable all-year top, in which all the windows but the rear one may be raised or lowered.

General Motors Declares Dividend.

The General Motors Corp. has declared the regular quarterly dividend of three per cent. on the common stock and 1½ per cent. on the preferred stock, payable Nov. 1 to stockholders of record Oct. 15.

G. A. C. ACCELERATOR FOOT REST.

Every driver of an automobile equipped with a foot accelerator realizes the importance of foot stability as effecting the car movement. With the

foot supported upon the heel only, every jolt and jar of the car means a sudden acceleration or retardation of the speed and attendant strain upon the engine. The G. A. C. accelerator foot rest is a device that has been designed to relieve the foot and leg strain by carrying the weight of the foot in a specially designed rest, which is so arranged that the accelerator pedal may

be held in practically any position with a minimum amount of effort. With this device, which is ornamental in effect, unsightly holes in the car matting, as well as shoe wear, is prevented.

Manufactured by The General Appliance Co., 127 Federal St., Boston, Mass. Price \$1.50.

For Standard Electrical Unit.

The Summer meeting of the Automotive Electric Association was held at Fisher's Island, N. Y., September 6th, 7th and 8th and was attended by representatives of every company in the organization. The business sessions were followed by entertainment features including a cruise down Long Island Sound, a carriage drive around the island and a clam bake on Life Saving Beach.

The following resolution was adopted with reference to standardization of electrical equipment on A and B government trucks: "Resolved, that this Association composed of the following manufacturers of starting, lighting and ignition equipment, to wit: Connecticut Telephone & Electric Company, Dayton Engineering Laboratories Company, Dyneto Electric Corporation, Electric Auto Lite Corporation, the Leece-Newville Company, North East Electric Company, Remy Electric Company, the Robins & Myers Company, Splitdorf Electrical Company, U. S. Light & Heat Corporation, Wagner Electric Manufacturing Company, desires to co-operate with the Government to the fullest extent in adopting a uniform standard electrical equipment for its class A and B military trucks and will adopt as one of its standards the design which the government engineers may work out."

The following papers were presented:
"Why we should stardardize business forms and practices," C. O. Miniger;
"Patents," Victor S. Beam; "Advertising," J. C. McQuiston,

Edsel Ford's Exemption Claim Turned Down.

The exemption claim filed by Edsel Ford, son of Henry Ford and secretary of the Ford Motor Co., has not been allowed. He founded his claim for exemption on the grounds that he was engaged in war work, as the Ford Motor Co. was making supplies for the government.

Goodrich Exemptions Light.

The B. F. Goodrich Rubber Co., Akron, O., while employing 25,000 people, a large percentage of which were registered for conscription, asked exemptions for only 17. In these cases the men were vitally necessary to the company in the progress of certain contracts which it is fulfilling for the government. Immunity was granted in each instance by the exemption board.



NOTICE TO READERS.

This department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars, do not healtate to lay your troubles before him. He will snawer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should siways be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

WHAT METHODS DO YOU USE TO LOCATE KNOCKS IN THE ENGINE OR TRANSMISSION OF YOUR CAR?

To the writer of the best answer to the above question \$2.50 will be paid. For the next best answer \$1 will be paid. The best answers received will be published in the second issue after the appearance of the question in the magazine. Answers to the question should be in the hands of the editors by the 5th of November. The contest is open to every one.

REMOVING CARBON FROM CYLINDERS.

(C. A. DuBois, Waltham, Mass.)

Before beginning the carbon removing process, the engine should be run until it has warmed up, then through the carburetor air intake, slowly inject about ½ pint of kerosene oil. Run the engine until the kerosene smoke is dissipated. This procedure will loosen up the carbon to a certain extent.

The spark plugs, pet cocks, and valve covers should then be removed and placed in a pan of kerosene. Turn the engine over by the hand crank until the piston in one cylinder is nearly to the top of its stroke, or so that the top edge is flush with the top edge of the cylinder. Care should be observed not to leave the side walls of either the piston or cylinder exposed to the sharp edge of the scraper. The work should be done upon the cylinder which has both valves closed.

Obtain a flexible carbon scraper (from any supply house or repair shop) and bend one end into such a shape that it will reach the top of the explosion chamber. Go over the chamber very carefully with the sharp edge of the scraper and after the carbon has all been loosened do the same with the top of the piston and valves.

The loose carbon should then be collected into a pile and removed with a flat knife or tin. If the knife or tin is dipped in cylinder oil the carbon will adhere to it easily. The balance of the loose carbon may then be removed by blowing air into the cylinder with compressed air hose or tire pump.

Next take a piece of soft cloth, dip it in kerosene and wind it around the scraper. Swab the cloth around in the cylinder and valve pockets to loosen up all remaining carbon. Finally do the same with a dry cloth.

It is essential that the work be done upon the cylinder



THOSE who desire from their cars the utmost efficiency and the utmost reliability, who desire to be without the annoyance of constant battery attention, specify

BOSCH

MAGNETO IGNITION

BOSCH MAGNETO CO., 204 West 46th St., New York

Service Stations in Every State

MORE LITE LENS

Complies With Dimmer Laws in All States.

100% Light 50% Cost

BE SAFE and SAVE THE FINES

More Lite Lens were designed by experts and are made by specialists. The prisms are so arranged that the blinding glare from the use of ordinary glass is absolutely overcome,

yet the light rays are increased and diffused over all the road and on both sides so that the driver can see clearly at all angles.

To install: Merely remove present glasses and insert More Lite Lens.

Guaranteed by the maker and endorsed in all states having a non-glare law.

Compare these prices with other makes, then send your order direct or buy from nearest dealer. Look for "More Lite" on every lens.

 7%- 8% diameter, in inches, per pair
 \$2.00

 8%- 9½ diameter, in inches, per pair
 2.25

 834-10% diameter, in inches, per pair
 2.50

 10%-10% diameter, in inches, per pair
 2.75

L. E. SMITH GLASS COMPANY
MOUNT PLEASANT
PENNSYLVAN



effected, so that I doubt if the cylinders are scored. I have installed leak proof rings and had the pistons grooved and bored with drain holes to stop all possible oil leakage, still the trouble persists. Can you give me any advice upon this matter?

That you are not alone in trouble is evidenced by many queries from our subscribers. The carbon evil seems to be increasing rapidly and would seem to be caused directly by the low grade of fuel which is now being used. By low grade is meant low test fuel which approaches kerosene to a certain extent.

When this low test fuel is used vaporization is not as complete as it is with gasoline, the result being that liquid kerosene is introduced into the combustion chambers. This liquid kerosene cuts the lubricating oil and soon finds its way into the base, diluting the lubricant to such an extent that the oil soon becomes thinner and works into the explosion chamber, where it carbonizes. Frequent draining of the oiling system and replacement with new oil is to be recommended for this trouble.

Kerosene or low test fuel is rich in carbon. The proportion of air to vapor when kerosene is used is different than when gasoline is used. For this reason imperfect combustion results and carbon is deposited upon the explosion chamber.

Special manifolds and vaporizing devices now on the market are designed to make the hurning of kerosene or low test gasoline possible and nearly all of them make use of the exhaust heat for vaporizing the fuel. The manufacturers claim that less carbon is formed when such devices are used.

Another method of keeping down carbon formation is to introduce a certain amount of water vapor or steam into the cylinders, together with the fuel. Experiments have proved that water vapor will crack off carbon from iron if sufficiently heated.

Either the installation of a special fuel vaporizing attachment or water vaporizing device is to be recommended if one is troubled with carbon. In every case the engine and manifold design plays an important part in satisfactory operation, so that a device which might give good results on one make of car might not work on another type. Before purchasing such equipment the manufacturer should be corresponded with, unless the device is intended for that particular type of car which the prospective buyer owns.

TOO RICH A MIXTURE. (F. J. M., Albany, N. Y.)

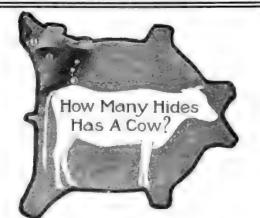
Will you kindly tell me how to remedy a trouble that has been causing me a great deal of bother lately? Every time I try to start my engine, it requires quite a number of trials. I am sometimes obliged to run the starter five or six times, and when the engine is started a great deal of smoke comes from the exhaust for about two minutes. For about that length of time, the engine runs slugglishly and skips. I notice that there seems to be a gasoline leakage at the carburetor as soon as I try to start. After the engine has run for a few minutes, and the smoke has ceased, it runs all right and gives plenty of power. With the engine standing idle the carburetor does not leak.

The leaking of the carburetor of which you write, is really not a true leakage. The gasoline is drawn into the mixing chamber by the suction of the cylinders in excess amounts and is drained from the chamber by a little vent which is made for that purpose.

The reason for the excess gasoline supply is either because the needle valve is opened too far or because there is some obstruction in the auxiliary air inlet tube.

Since you did not tell us the make of your car we cannot give specific directions for the carburetor adjustment. would suggest that you first try to cut down the gasoline adjustment as low as possible without effecting the running of the engine when throttled down.

It this does not remedy the trouble, inspect the hot air or so called auxiliary air intake line. It sometimes happens that on cars fitted with hot air intakes the small holes become obstructed and the supply of air cut off, causing more



Uncle Sam Knows the Real Answer NOT ENOUGH!

SAVE LEATHER FOR SOLDIERS

To make America's hide supply go as far as possible, hides are being split into five or more thin sheets; but even this saving scheme fails to meet the requirements for soldiers' shoes, harness, equipment, ship upholstery, factory needs, etc., chiefly because too much hide leather is used by the public in places where high grade leather substitutes will serve as well or better.

For instance, the leather upholstery of one average size automobile would make twenty pairs of soldiers' shoes. For years America's largest producers of automobiles have sucessfully used



MOTOR QUALITY

for upholstering their cars Thousands of owners never even knew their cars were not uphoistered in leather. because Fabrikoid looks and feels just like the finest leather and actually wears better than the coated split leather most used for upholstery of automobiles not covered with Fabrikoid.

It is true that some few high priced automobiles are still upholstered in genuine grain leather of good quality.

But the pride of possession of luxurious, expensive leather should now yield to patriotic preference for satisfactory substitutes that will divert this leather to more necessary uses.

UNCLE SAM HAS SET THE PACE

The new U.S. motor trucks and ambulances will be upholstere in leather substitutes.

The upholstery specifications for the new Merchant Marine call for "Craftsman Quality Fabrikoid."

What Uncle Sam has found by experience and tests good

enough for the Government's severe requirements should be good enough for every loyal American

If you are a manufacturer using leather, probably part of all of your requirements can be met by some grade of Fabrikoid.
When buying an automobile prefer Fabrikoid upholstery.

Help the manufacturer conserve leather by patronizing those who use good leather substitutes like Fabrikoid. Every hide displaced by a good substitute helps supply our

armies with shoes, our farms with harness and our factories with belting-it helps win the war. Write us your requirements and let us co-Manufacturers!

operate with you. Send for samples and booklet.

DU PONT FABRIKOID COMPANY WILMINGTON, DELAWARE

World's Largest Monufacturers of Leather Substitutes Factories at Newburgh, N. Y., Elisabeth, N. J., Fairfi dd, Con., Toronto, Ont.



FILTERING LUBRICATING OIL. (R. V. McC., Auburn, Me.)

Will you please tell me how to filter oil taken from engine or transmissions so that it may be used again?

If you intend to clean oil in large quantities a strainer such as is shown in the first sketch is recommended. A, is a large size truck funnel or pail, fitted with two gauze screens, m and n, the upper being of slightly coarser mesh than the lower. The funnel is connected by 1/4 inch brass pipe to the side of the pail B, near to the bottom.

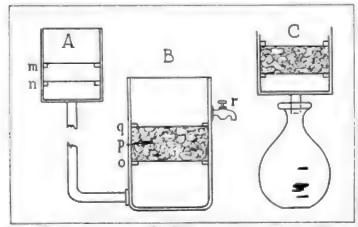
The pail B, is fitted with two fine mesh screens o and q slipped into place in such a manner that they will hold the waste and wool into place as shown at p. The material shown at p should be composed of about half and half mixture of cotton waste well picked apart and steel wool and should be cleaned very frequently.

Immediately above the top screen is fitted a draw off faucet R. The space above the screens should be large enough to hold all of the oil from A.

This device possesses a number of advantages over the regular type, chief of which is the general tendency to clear the screens due to the fact that the heavier particles will drop to the bottom of the pail B without clogging the screens or wool mixture.

The rapidity with which the device will filter depends of course upon the height of A above B, the grade of oil and the thickness of the wool mixture.

If oil is to be filtered in small quantities a funnel arrangement as shown in the second sketch will give good results.



Two Easily Constructed Oil Filters. A. and B, Large Filter. C, Small Filter.

In this type of filter the wool and waste is held between two fine mesh screens. The oil being poured into the top and collected in a jar or bottle at the bottom.

It is not considered good practice to use oil over and over again even after it has been filtered, because after a time it will loose its lubricating properties. For this reason oil that has been filtered is never used in the engine or transmission again, but used around the shop or in places on the car that are not subjected to much heat or friction. Many garages use filtered oil only in the squirt cans and for lathe turning.

Military Test of Highway Transportation.

The War Department proposes to find out definitely how much help it can obtain in transporting men and supplies over the highways instead of by mail. On Oct. 11 six two-ton trucks will leave the post quartermaster's warehouse at Atlanta, Ga., on a 115-mile run to Ft. Oglethrope, Ga. These trucks will carry loads of supplies needed at their destination. At the same time a special passenger truck will transport 16 soldiers with their guns, ammunition and full field equipment from Ft. McPherson to Ft. Oglethorpe. The journeys will be made under careful observers so that a complete record of the time and cost of the trips will be obtained. This information will not only include the facts relating to the actual runs, but also the time and cost of loading and unloading the supplies, weather and road conditions, and the behavior of the trucks.

Friction starts <u>Grinding</u> before Grease begins <u>Lubricating</u>

Common grease needs heat to soften it before it can lubricate. The parts grinding together must furnish this heat in the shape of friction. Meanwhile these parts get no lubrication. And Friction—getting a good start—is never caught up with by grease.



Lubricates Instantly—and Always

NON-FLUID OIL lubricates the second your car moves from rest—and every minute it is in motion. Doesn't give friction a chance to start. It never melts, never leaks out, is much purer and longer lasting than any grease you can buy.

If you buy lubricants on the same basis that you buy tires purely on service, you'll ask for NON-FLUID OIL every time. Get "K-oo Special" grade for pears; "K-ooo" grade for bearings. Sold at your dealers in orange-colored cane only.

Write for a free booklet, "Lubrication of the Motor Car."

New York & New Jersey Lubricant Company
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Giant Searchlight

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low gear casting which rotates upon the countershaft.

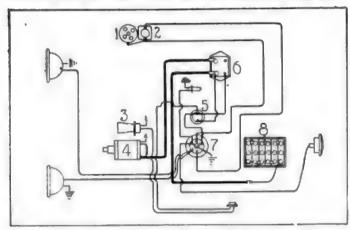
The reverse idler gear is mounted upon a bracket which is located on the left side of the transmission gearset and retained by six screws. When the bracket is removed, the retaining pin may be taken out allowing the gear and shaft to be disassembled.

Rear Axle and Differential.

The rear axle is of the full floating type and may be entirely disassembled without removing the housing from the car. The rear of the car should be jacked up to remove the weight from the wheels and the eight nuts holding the wheel hubs removed. The wheel hubs may then be withdrawn, carrying the driving shafts with them. The differential cover plate is next removed, exposing the differential assembly.

The differential assembly is carried in roller bearings which are held in clamps upon the propellor shaft housing. These clamping brackets are fitted with caps which should be removed, permitting the removal of the differential case with the bearings and races. Four stude and nuts are used for fastening the two differential housings together, when these are removed, the differential may be disassembled. After the differential has been assembled and the brake control rods removed, the cap screws which fasten the drive shaft housing to the rear axle should be taken out and the drive shaft unit pulled from the axle.

To disassemble this unit, the pinion gear must first be removed from the shaft. The gear is keyed and held by a



Starting, Lighting, and Ignition Wiring of the Later Dodge Brothers Cars. 1, Distributor; 2, Ignition Coil; 3, Horn; 4, Motor-Generator; 5, Current Indicator; 6, Starter Switch; 7, Ignition and Lighting Switch; 8, Battery.

nut, and, with the nut removed, may be drawn from the shaft with a wheel puller. With the gear removed, the shaft may be drawn from the front end of the shaft.

Both roller bearings are held in place and adjusted by bearing adjusting rings which may be inspected or unscrewed through a hole in the top of the shaft housing which is fitted with the adjusting ring lock.

It is of the utmost importance that the relative positions of the pinion drive and the driven gear are correctly made, or these gears will wear very rapidly and cause much noise and grinding.

After the drive shaft and differential have been reassembled and the rear axle put into place a careful adjustment should be made as follows:

Adjustment of Driving Unit.

Turn down upon the drive shaft adjusting collars until the edge of the pinion gear teeth are in a line with the backs of the teeth on the master or ring gear. Then turn on the differential adjustments until both gears are meshed, or bottomed against each other with the back edges of the teeth forming a smooth line. With the gears bottomed, the teeth should not overlap each other on the ends. If the adjustment is left this way, the gears will grind, because they are set too tightly together. The drive shaft adjustment should be backed off one or two notches, as should also the



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i. Below is a partial list of products shown in the catalog.

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1917 SALES

FOREIGN BUSINESS \$90,958,243.00

From National Automobile Chamber of Commerce, 7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Per Cent. Decrease in Shipments to Great Britain, France and Russia During Last Fiscal Year—Big Increases to All Other Countries—Shipments Total 80,811 Cars, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less-Fewer Trucks and More Passenger Cars.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917, the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analyzing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased ship ments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe

Exports of commercial vehicles and passenger cars during the two years were as follows:

No. Value No. Value Commercial.... 21,265 \$56,805,548 15,977 \$42,337,315

40,660,263 64,834

Passenger..... 56,234 Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14,468,-233 less, the shipments of passenger cars increased by 8600 and their value by \$7,960,665.

Great Britain and France were still our largest markets, despite their heavy falling off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all trucks and amounted to \$14,691,460, as compared with \$19,-137,904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,-874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries. Holland and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries, Canada is America's best customer for motor cars, having increased her purchases by nearly \$4,200,000--from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647-an increase of \$1,248,735 over the year before.

The most remarkable increases, however, are shown by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took automobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States exported in the last fiscal year 23,435 automobile engines, valued at \$2,844,406; tires worth \$12,330,201 and parts worth \$27,284,932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

If you are a member of the Foreign Trade Bureau conducted by the Automobile Journal Publishing Company you can reach 8,000 foreign buyers of pleasure cars, trucks, fittings, supplies, accessories, tools and equipment in more than 81 foreign countries.

48,620,928

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Automobile Journal Publishing Company PAWTUCKET, R. I. TIMES BUILDING





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191

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HOLDFORD BRAKES are high-grade external contracting brakes for Ford cars, which can be easily and quickly installed to act from the hand lever as emergency brakes, or from the foot pedal as service brakes. Designed in accordance with the best engineering practice; the band and brace are of steel, the toggle crank and bracket are drop forgings and the lining J-M non-burn. Do not drag when released, no readjustment for wear is necessary and oiling is easy.

The brake usually supplied with this car cannot be depended upon in that "tight corner" or "on the hill." The hand brake wears out quickly and allows the car to creep when being cranked. The constant use of the foot brake quickly wears out the transmission. As the foot brake operates from the drive shaft any accident to the axle or the stripping of gears might mean a serious accident.

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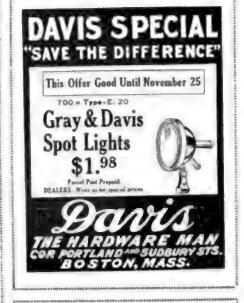
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Many veteran dealers have tried out systems based on the initial cost of the car, only to find depreciation very elusive to reckon, not only because some cars depreciate much more rapidly than others, but because the rate of depreciation will not follow the decimal system. For instance, a \$2000 car and a \$1000 car will not depreciate respectively \$200 and \$100 in a set period of time, and the trade will say that the cheapest car on the market today depreciates less than any other car. Aside from that two cars of the same year, sold on the same day and coming in for an exchange a year later will be far apart in value, according to the mileage they have gone and the difference in conservation or severe treatment they have had by the drivers and garage men who have had them in charge.

Surplus Service Designed in Cars.

Practically every car manufactured is so designed and constructed that it is good for from 50 to 100 per cent. more service than is ever required to perform. Of course many cars never live out their normal lives, owing either to accident, their value is often greatly depreciated.

Cars in Various Service Stages.

When a man gets his car new he is usually particular about its use and does not want to mar it in any way. Soon he begins to use it to carry his tools or merchandise about in and finds that he can both use it for business as well as pleasure. Demands of business, which have probably increased through the use of the car, soon require that he remove the tonneau and replace it with an express wagon body. As his delivery or haulage requirements increase he buys a truck forming attachment and transforms his car into a one-ton truck. Several years have elapsed since the car started on this process of evolution and in two years more possibly he trades the outfit in for a new truck. It may and may not have enough service left in it to make it saleable, but if it hasn't the dealer doesn't junk it, but dissembles the parts. The motor finds its way out to Jones' farm and is found there for several years more pumping water, cutting ensilage, or doing other power work. The steering gear, transmission, differentials, axle Listen to this statement from a man in New York, who has survived the business maeistrom for a score of years:

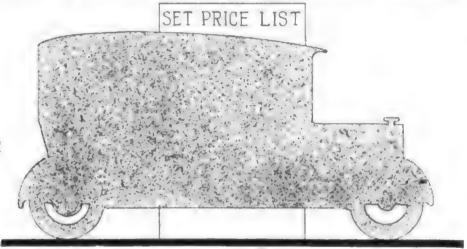
"I do not differentiate in my business. To dispose of anything that is in my sales rooms or store rooms for sale we apply our utmost sales ability. We, of course, advertise ourselves primarily as distributors of the 'best' car, but as we have to handle from six to eight used cars for every 10 new cars we place, our advertising expenditure for the used cars is almost equal to that expended for publicity on the new machines.

Applying Sales Ability.

"Our salesmen are instructed to look up all the sales points on every car we take in trade and in most cases if called upon can give as good a sales talk on it as though they were selling a new one. We take them in only on a basis where we can add a sufficient selling cost to make this method possible.

"Any other policy would be business suicide. It is a known fact that if second sale cars are to be handled on a business basis, the cost of selling will be as great as that of selling a new one. To handle this merchandise profitably then it must be necessary to treat it with the same attention.

"In order to be successful, as in all business, the dealer must buy right. That means that when he takes a car in trade it must be accepted on an actual intrinsic value. When the dealer does this his goods are half sold. He acquires profit in the car from renovation and repair and makes a fair additional profit on selling costs. The difference in price of the car or sentimental attitude toward it should make no difference in the amount of attention devoted to its sale. As there is less service accommodation with it, the profit to be expected is naturally less than that to be expected on a new car, but it should be so priced as to show nearly as much profit on the investment as that on the regular line handled by the dealer.



The Car Itself Stands in the Foreground, Effectually Wiping Out Calendar Prices.

misuse or carelessness, but with a little care the life and serviceability of a car is far beyond what it is generally supposed to be. Perhaps the most striking illustration of this fact is found in the history of the famous "Hyatt Roller," a model 16 Buick, which in the past eight years has covered over 272,963 miles. which is still running on its original bearings and is good for many thousand more miles of travel. This car, however, did not receive any particular care, as, in the course of its long history it has often been used for work which would call for a much heavier vehicle, has been run under all kinds of road and weather conditions, having recently traveled back and forth across the country without a

There is no reason in the world why other cars, equally well built, would not duplicate this performance, and, if so, why should a machine be condemned as worthless at the end of 25,000 miles, or one-tenth the distance covered by the "Hyatt Roller?" The service is still in these machines, but on account of an artificially rigged second hand market

assembly and equipment either as a whole or in part find their way to some repair man's garage, where they are used in making replacements and repairs.

Overshadowing the Car Market.

Too often the dealer has looked upon his used cars as secondary stock, which required some sales attention, but no great expenditure of sales effort, overlooking in the meantime the fact that \$10,000 tied up in used cars was just as much capital as \$10,000 tied up in new cars.

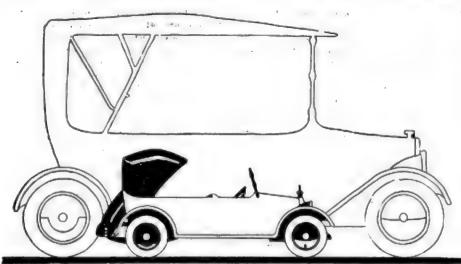
He has spent hours, weeks and months framing up a sales policy and methodo to dispose of the car for which he is an agent. He studies its superior points, its service value and, in fact, every conceivable sales point that the merchandise lays claim to. Similar study of the used cars he has on hand is equally as essential, as they probably represent as much money invested as his complete line of new cars. Here is the crux of the situation. In the used car department do not hesitate to analyse business and gather the details of its several elements in their true proportion.

Upholding Remaining Values.

"The salesmen should be familiar with every point of the car and its latent service possibilities. To do this, of course, he must be thoroughly acquainted with the operation of a car, and be able to tell the condition of the motor, brakes, tires and other wearing parts, so that he can estimate the value quickly, and, furthermore, he must be familiar with the 'junking value' of the parts, as in the last analysis this is what the car is actually worth if it cannot be disposed of as a going machine All the metals in a car now have a high junk value, while many of the parts, of course, can be rebuilt and sold for further use and bring prices that will make the total value of the car almost as much as if it had been sold at its second hand price.

"The day is passed when the used car is cast aside like a dilapidated umbrella. It is never so badly wrecked but what it is worth at least 15 to 20 cents on the

"Taking all these facts into consideration as establishing the intrinsic commercial value of a car, when the service re-



There is No Need to Go On Letting Used Car Business Overshadow New Car Sales.

maining in a usable car is valued and added to the other, nearly every car should be worth at least 40 per cent. of its original cost."

Letting Go of Set Price Guides.

Another, a dealer in the South, abandoned use of the practise of taking 20 per cent per year from the initial cost of the car and also found after trial that a grad uated chart could not be relied upon. The faults in these methods developed in the lack of consideration given to the all important elements of demand and serviceability.

Another firm said set price guides, which only give a bewildering high and low value, prove of no value to them, in fact, nothing but a detriment. If one cannot arrive at the value of the car by laboratory methods, coupled with the knowledge he ought to have of car values as a car dealer, there would be little use stopping to make an appraisal at all.

One dealer holds steadfastly to the belief that general appearance is the most important factor to consider in arriving at the value on a used car. This dealer broadly includes in general appearance the service values in vital parts, and he also extends the same rule to his selling points in disposing of the car after it has been dressed up and made fit for turning over to another customer. He says the first impression is a most important one

in the handling of a customer, and that this is especially so with a used car or an overhauled car. Price is not the only feature to interest a prospective purchaser, he says, but maintains that one cumulative value after another must be presented when the man has his attention sharply arrested by an intrinsic merit. Sometimes he finds it necessary to recede from an asking price and does so gracefully on the assumption that the minute an ardent impression cools the dealer can prepare to see the man walk out of the door unsold, and he tries to keep turned away customers down to a minimum.

A sales policy used with success at one place which puts out a large line of used cars, points out to a prospective purchaser the various features of the different makes, gives the prices and finds out what the purchaser's intention is regarding price. When the salesman has found this out he has a substantial basis from which to work. He knows the reputation of the maker, the reputation the car has earned for service and, if possible, something about the previous owner and the usage the car received. After acquainting the prospect with these points his strong remaining point is that of serviceability.

The average customer banks largely on looks. If the car has retained most of its original lustre, the fact can be dwelt upon for what it is worth, but it is far better for the salesman to keep attention directed on the amount of actual service that the car still possesses. When he hears that it is good for several more years of use at the average rate of operation, either as a passenger car or for commercial purposes, the customer's prejudice against its appearance is largely dissipated. He is also made to realize that he is getting a car for \$500 or \$600 that is just as good as neighbor Jones', which was nurchased two years previous and of the same model, for \$1000 or \$1200. He learns that it will not cost a cent more to operate than Jones' car and that it will go as far and as fast.

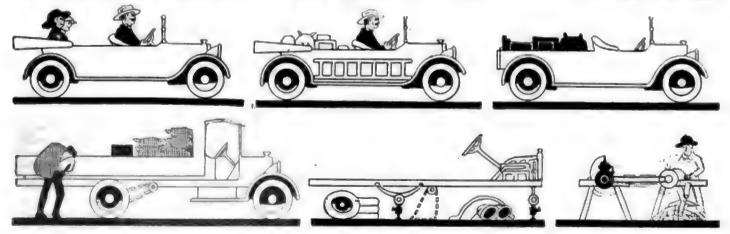
When a thoroughly sound sales argument of this type is built up and used in disposing of the used car, some of the pitfalls dug for motorists and the trade by set price systems may be avoided.

Joins Issue Against Set Prices

Western Motor Journal Advocates Traveling Values on Used Cars Instead of Advanced Condemnation Prices

UT in Kansas City, where Theodore
Roosevelt has been working as a
newspaper man, where the breezes
of Kansas whistle around the river bluffs
and whisk their way from the Kaw valley
into Missouri, there is a well grounded
opinion that the owner of a motor car

should receive a fair value for his used car when he desires to turn it in and get a new one. Just how strongly this opinion takes hold in one of the best towns west of the Missisippi is told in a late issue of Motorview, speaking appreciatively of the opposition of the Automo-



Progress of a Car Through Five Stages of Service from Newness to Disassembi y: The Pleasure Ride, the Carrier, More Carrying, Converted, Taken Apart—The Motor Still Working.

























Senator La Follette will not laugh a lot if many more of the automobile men get the hook out for him. President A. R. Erskine of the Studebaker Corporation, South Bend, Ind., introduced a resolution at a meeting of the Rotary club in that city asking for an investigation

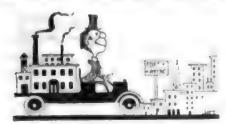


by the Senate of the Wisconsinite's alleged seditious and disloyal utterances. The resolution demanded the immediate unseating of La Follette if the charges were true. A copy of the resolution was mailed to Vice President Marshall and the senators from Indiana.

A head mechanic in a Jersey City garage has a racing car with which he has been busting fences at the fall fairs in that little old state the President comes from. The head mechanic built it himself. He used a Pope-Hartford engine and parts from 12 different makes of automobiles. Before acquiring the fence breaking habit at Trenton and Danbury, where there were muddy tracks and other racing gentlemen competing by the names of De Palma, Chevrolet and Lou Hearn, the car ran a well behaved course at Red Bank and took down prize money.

Ft. Wayne, Ind., is feeling its oats these days since the Supreme Motors Corporation of Cleveland decided to favor it with a million dollar car plant and the city fathers are looking forward to the day when it might rival the Automobile Capitol as a motor car centre. The

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new company will be headed by Clarence F. Jamison of Lafayette, formerly assistant general manager of the Elgin Motor Car Co., and his reasons for selecting Ft. Wayne as a site for the new plant are also a source of pride for the residents. He says: "We selected Ft. Wayne be-

cause of the excellent spirit of co-operation and continual boosting for which this city has become famous throughout the country."

Pretty girls in cars loaned by Manhattan's automobile row invaded Wall street and the congested sections of the city at a recent noon hour selling tickets to the United States Army and Navy Bazar, carded for the Grand Central Palace, Oct. 27 to Nov. 3. They came away with knitting bags stuffed full of coin and bills.

Manager McGraw of the New York Giants is solacing himself for the loss of the world's series in a Paige landaulet limousine, which he bought one day during a lull in the big battle between the baseball boys.

It is admitted that the Germans are in a bad way, but every motorist's heart will go out to the Crown Prince in his present hour of great sorrow. Although Papa Kaiser is the sole owner of four pneumatic tires in Germany, his favorite



son Willie has been denied their use and is obliged to pilot his car back and forth across the highways leading to the front with nothing to absorb the shocks and road jolts but old ropes, rags and other materials which are wrapped about the wheels of his car in place of tires. His torture, however, is shared by all other Germans who persist in motoring, as the only substitutes for tires to be had are makeshifts similar to those used by the Prince. There is very little motoring in that country now, as only army officials and others high up in the matters of state are granted the privilege, gasoline being worth over \$6 a gallon.

The defunct Black Diamond Automobile Co. paraded into the New York mayoralty campaign, thereby inducing Charles E. Turner of Brooklyn to submit an affidavit that Judge Hylan ceased to have any connection with the company before the person who wrecked it was brought into it. Mayor Mitchell's fight for re-election as an independent candi-

date has run the bearings of this impending municipal election exceedingly hot.

The demise of the Demon Rum which seemed so imminent when Congress got after it with an excessive tax seems to have been postponed indefinitely, since



in the dry states the boys continue to devise ways and means of bringing their favorite beverages past the state officers. In Hagerstown, Md., ingenious persons conceived the scheme of pumping liquors into the deflated tires of automobiles in order to get it into dry West Virginia, but were detected when one of the members of the party, being unable to resist a burning thirst, was caught drawing a high ball from the tire valve.

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Motoring enthusiasts in Easton, Pa., have had the joy of their local automobile show deferred from October until late in January, due to the discovery by the committee of arrangements that most of the dealers will not have their 1918 models until that time. Meanwhile "the orchestra and decorations will be greatly augmented, as the additional time will be utilized in thinking up new schemes to please the public." Listen for much music and many motors in Easton in January.

Taxicabs in Detroit have become one of the most popular forms of travel with the stage door Johnnies, the town flirts and lady killers since the young lady chauffeurs made their appearance on the



box. They are attired in special uniforms, readily learn to navigate their cars through the crowded sections of the down town streets, and are immune to the wiles and advances directed at them from passengers in the tonneau who might be inclined to flirt.

Must have had another big potato crop in Maine. Under the state law a car owner gets a half rate on license registration between Oct. 1 and Dec. 31. It is evident that a whole lot of people have heard of that provision of the law and delayed purchasing their autos, says the Bangor Commercial, for they are appearing in "droves" at the Automobile Registration bureau, department of state, for registration under the reduced rates.

Patriotic motorists in many cities aided the flotation of the Liberty Bond issue by carrying placards on their cars or



having signs painted on the windshields. It takes a great war to make a motorist let a billboard be made of his car front. After the war is over, what?

Lima, O., made a great time of the departure from that city of the first Liberty war truck. The standardized machine, built in the Gramm-Bernstein factory there, was the centre of honor in a patriotic parade just before it left on its overland trip to Washington, a christening ceremony was held, anthems were sung on the public square and patriotic addresses made. There will be 35,000 copies of it made in the same factory to go trekking with the National Army on the trail of the Kaiser to make the world safe for democracy.

Not only will the National Automobile Shows to be held in New York and Chicago have a greater number of cars on exhibition, but the displays of parts and accessories will outnumber those of any previous show.

Honeymooning in an automobile is no novelty, but participating in a marriage ceremony while going over the road at 25 miles an hour is unusual enough to



warrant more than passing attention and that is the reason why a ceremony under those circumstances was decided upon by Mrs. Dora Patton and Claude C. Walters of Marion, O. The bride in explaining this peculiar choice of a bridal setting, said: "No. It wasn't an elopement. We just wanted the novelty of the thing, so we speeded up."

Camouflaging automobiles is an art and science now in the war zones of Europe and it has been perfected to a state where the car at any great distance be-



comes almost invisible. Military men in this country have been experimenting with camouflaging and have obtained some remarkably effective results, treating their cars with different hues of paint so that they blend with the background at a short distance away from the observer and become practically invisible to the naked eye.

Practically all motorists have experienced close shaves while out touring, figuratively speaking, but literally speaking, the only close shave on record en tour is that performed by C. A. Lations of the C. A. Lations Auto Co., Worcester, Mass., who while en route to Boston drew some hot water from the radiator, took out his razor and accomplished the tonsorial stunt without mishap. He used the mirror on the rear of the spot light to reflect the operation while his companion drove the car along at a merry clip. He did not perform the stunt to prove that a motor car is as convenient



as a barber shop in which to procure a shave, but because his beard needed trimming. Incidentally, however, he demonstrated the exceptionally smooth riding qualities of the Elgin car in which he was traveling and for which he is the agent in Worcester County, Mass.

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The directors of the Kent County, Michigan, work farm, finding that it cost as much to feed the horses on the farm as it did to operate the institution, have decided to motorize the work next year. The year's crops and the money derived from the sale of the horses will provide a fund for purchasing the motor apparatus and they are of the opinion that the saving effected by the new equipment will soon defray the original cost.

The Macon, Ga., Motor club receives organizing assistance from a ladies' committee that put on a campaign to increase the membership of the proposed



motor club from a meeting held on the mezzanine floor of a leading hotel. True south land flavor in all those M's—Macon, mezzanine and motoring.

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Simon Lake, the inventor of the terrible U boat that brought our country into war, has turned his inventive genius to a more harmless device and one which instead of aiding the machinations of Mars can be turned to the pursuit of pleasure or money. His latest device is an undersea automobile, which he claims can be



used as a mother ship for submarines, for salvaging wrecks, digging up shell fish and from which one can spear fish.

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Garage proprietors and gasoline dealers in New York state would be required to post conspicuously the price, quality and make of all gasoline offered for sale under legislation recommended in the recent New York State Automobile Association convention. Other proposed legislation approved would make it impossible for road contractors to close a road without first having provided convenient and suitable detours; provide that both sides of a highway may not be covered with oil at one time unless that oil is suitably surfaced; render it impossible for any city or incorporated village except New York City to adopt local speed ordinances; or provide for licensing without examination or fee of all automobile drivers; make it obligatory for the names and addresses of automobile owners to be furnished by the secretary of the state and the police to automobile club when request is made through proper authorities.

-::The limit in eccentric body designs for



motor cars seems to have been reached by H. I. Silver, the New York dealer, who turned out a yacht like creation for one of his fastidious customers that suggests its nautical character in all its equipment and appointments. The ends of the fender in front are formed as anchors, a ship's bell is fitted on the radiator, a ship's wheel is on the engine hood, life preservers and other standard boat equipment are in evidence, while the body is launch shaped and made of two-colored wood, suggesting boat construction.



An Interesting Automobile Insurance Decision

Policy an Effective Instrument for Both the Assured and the Injured. Is Ruling Made in Massachusetts.

WO years ago the Legislature of Massachusetts enacted a law to the effect that "In respect to every contract of insurance made between an insurance company and any person, firm or corporation, by which such person, firm or corporation is insured against loss or damage on account of the bodily injury or death by accident of any person, for which loss or damage such person, firm or corporation is responsible, whenever a loss occurs on account of a casualty covered by such contract of insurance, the liability of the insurance company shall become absolute, and the payment of said loss shall not depend upon the satisfaction by the assured of a final judgment against him for loss, or damage, or death occasioned by said casualty. No such contract of insurance shall be canceled or annuled by any agreement between the insurance company and the assured after the said assured has become responsible for such loss or damage, and any such cancellation or annulment shall be void; and upon the recovery of a final judgment against any person, firm or corporation by any person, including administrators or executors, for loss or damage on account of bodily injury or death, if the defendant in such action was insured against said loss or damage at the time when the right of action arose, the judgment creditor shall be entitled to have the insurance money, provided for in contract of insurance between the insurance company and defendant, applied to the satisfaction of the judgment, and if the judgment is not satisfied within 30 days after the date when it is rendered, the judgment creditor may proceed in equity against the defendant and the insurance company to reach and apply the insurance money to the satisfaction of the judgment."

A few days ago the Supreme Judicial Court of Massachusetts was called upon to construe the statute, and as its opinion cannot but be of interest to motorists, we refer to it at some length.

Briefly, the court said, a suit in equity was brought by one who had recovered judgment for bodily injuries caused by the negligent driving of an automobile, and the insurance company who had insured the driver against loss or damage arising from such a case by a policy dated subsequent to the time when the statute became effective. A demurrer to the bill was filed by the driver and the insurance company on the ground, as they contended, that the statute was unconstitutional.

The court, in its opinion, points out some of the complexities of phraseology of the statute, but holds that the legislature has power under the Constitution to enact the statute, as the court interpretes it, and in support thereof quotes from an opinion of former Chief Justice Knowlton to the effect that the legislature has large powers for the regulation of the business of insurance; that it may act under the police power for the protection of the public, or it may act as the creator and controller of corporations, domestic and foreign, which are subject to its power, and that this has been decided in many cases in this commonwealth and elsewhere.

The subject of insurance, the court continues, is of such general public interest as to be under the control of the legislature within rational limits. When a statute has been enacted governing any particular principle of the field of insurance, the parties entering into contracts respecting that field are presumed to do so with reference to the obligations and terms established by that statute: Aithough prior to the passage of the statute now attacked, a contract of insurance like that here in question would have been valid and enforceable under a previous decision of this court, yet now the insurer, by issuing a policy of casualty insurance, impliedly agrees to be governed by the terms of the statute and to consent that this obligation to the insured shall, to the extent of a judgment recovered by a third person against the assured for a casualty covered by the insurance, be hypothecated for the benefit of such third person.

The statute is reasonable in its purpose and effect. Its obvious design is to afford to the assured, who has complied with every other term of his contract and has paid all premiums demanded by the insurer, to pay the loss and damage for which he was liable and against which he was insured. A man without capital or credit might be powerless to meet his obligation and put himself in position to recover against the insurer. The man of slender resources, or doing a considerable business on a small capital, might be forced into bankruptcy and get little or no benefit from the insurance for which he had paid. The persons injured by accidents, for which such classes of assured might be liable, would be in effect remediless as to practical results for damages sustained by them. It well might be thought by the legislature a sound public policy that casualty insurance should become an effective instrumentality for both the assured and , the injured, and not be a snare to the assured and a barren hope to the injured. If the legislature believed this, it reasonably might decide to frame the terms of policies of casualty insurance and to provide means for their enforcement to the end that these results might be avoided, and to declare that policies lacking these requisites should not be written, or if written, should be ineffective as to these terms.

When confessedly the general subject of insurance is under legislative control there is a broad latitude of choice as to the means which may be employed to reach results thought to be desirable. The principle here declared and the decisions upon which it rests do not derogate in any degree from the right of freedom of reasonable contract and the right to acquire and possess property which are among the essential guarantees of our Constitution. They do not infringe upon the principles declared in numerous cases sustaining such rights as illustrated by a former decision of this court and the cases there collected.

Of course the legislature cannot create a debt out of hand from one person to another without the express or implied consent of the person to be charged. But it is a very different thing to enact a statute to take effect as to contracts thereafter made.

Held that this statute is not unconstitutional, as the legislature may establish appropriate forms of relief for existing rights or those rightly created. and that it may provide equitable procedure for the enforcement or protection of such rights. The statute is a declaration of public policy by the general court respecting one aspect of casualty insurance. It is a declaration as to a subject within its general power of regulation. It governs contracts made after it took effect. It is not retroactive. Its terms are reasonable and violate no right secured by the Constitution. It is well within the principle of numerous decisions where statutes are more or less interfering with the freedom of contract have been upheld.

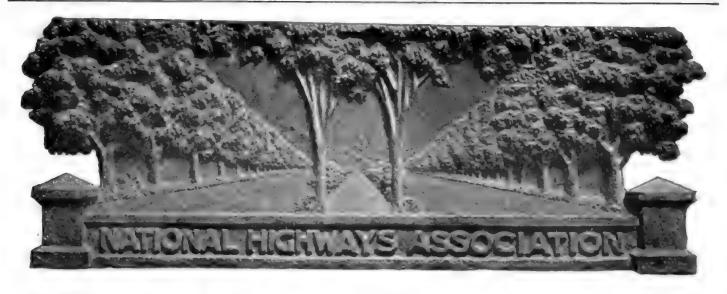
Order overruling the demurrer affirmed.

N. A. C. C. Takes \$50,000

Liberty Bonds...

At the October meeting of the National' Automobile Chamber of Commerce which was attended by representatives of over-100 companies it was voted to subscribe to \$50,000 of the second issue of the Liberty Loan and also to carry bonds forthe employees of the Association.

The members discussed the War Revenue bill as it relates to the industry and as it is interpreted that the intentionof Congress in placing the 3 per cent. tax, that it be paid by the buyer of thecar, it was the sense of the meeting that the amount of the tax should be added' as a separate war item on each car and) truck sold.



Early Registration Adopted in Massachusetts

THE Massachusetts Highway Commission is planning a decided improvement in its method of issuing registration number plates and certificates to motorists registering in Massachusetts. Heretofore the commission's offices have been overwhelmed with applications in December, January and February of each year, but this year the commission contemplates sending out a notice at once to the owners of the first 50,000 registered cars in 1917, to the 3000 or 4000 dealers and to the 25,000 owners of commercial

vehicles, giving them an opportunity to file their applications during November and December and of receiving their number plates and certificates in time for the attachment of the plates to the cars on the first day of year 1918.

This system will be a great improvement over that previously in operation and will be a considerable relief to the thousands of owners of motor vehicles of Massachusetts. Where this system, or a better one, does not prevail we recomment this improvement to motor vehicle commissioners generally. and gravel roads. Running from Portland to Lewiston, a distance of 33 miles, are good dirt roads, and from which place one may follow the state highway to Augusta and on to Farmington, thence to Rangeley via Strong, Phillips and Madrid. This is the best route. There is a dirt road leading from Lewiston to Livermore Falls through to Rangeley via Farmington.

This route leads northward through the busy towns of Auburn and Lewiston, thence through the Maine woods, following up the Androscoggin valley to the lakes.

HUNTERS' HORNS IN MOOSE LAND

Routes to the Great Maine Game Preserves and Where Non-Residents May Obtain Their Licenses.

THIS is the season when "the woods are calling" and "the horn of the hunter in heard on the hill," and to those motorists who enjoy the vast expanses of nature's great playgrounds—the hills and the forests, the lakes and the streams—we call attention to a few of the great game preserves in the State of Maine, as well as motor routes to them.

There are five principal chains or systems of lakes in Maine to which game is naturally attracted, namely, the Moosehead series, including Moosehead Lake. of about 120 square miles in area, the largest inland body of water in New England; the Rangeley series, consisting of some 90 square miles, drained by the Androscoggin river; the Schoodic, in the southeastern part of the state, drained by the St. Croix river; the Penobscot series, consisting of Shesuncook and its surrounding lakes on the west, and with Allagash, Chamberlain and others on the east; and the lakes that form the head waters of the St John river and its tributaries.

Besides these there are, of course, a number of other game lands such as the Machias lakes section and the Caribou country and others.

MOOSEHEAD LAKE REGION.

Routes. From Portland to Moosehead Lake, via Augusta, Belgrade Lakes and Skowhegan, is a very attractive trip and leads to good hunting grounds. The distance is 178 miles of good country roads; these roads are in fairly good condition. The route is very picturesque from Portland to Augusta, via Falmouth, Auburn, Lewiston to Winthrop, a distance of 64.5 miles. From Augusta to Belgrade Lakes is a short distance of 18 miles, thence to Skowhegan via Oakland and Fairfield Center, to Moosehead Lake via North Cornville, Athens, Harmony, Cambridge, Parkman, Guilford, Abbot and Monson to Greenville, which is the setting point there for the Moosehead Lake region.

RANGELEY LAKE REGION.

Routes.
From Portland to Rangeley Lakes is a distance of 130 miles, of fair to good dirt

PENOBSCOT REGION.

Routes.

Houlton is considered a vast forest territory and affords good hunting; it is also one of the largest cities in Maine for hunters. Run from Bangor to Houlton, a distance of 116 miles of dirt and gravel roads, crossing the Kennebec stream to Veasie on to Orono, Old Town, Costigan, Olamon, Passadumkeag, W. Costigan, Olamon, Passadumkeag, W. Enfield, to South Lincoln, to Lincoln, Winn Mattawankeag, to Maswahoc, Linneus into Houlton.

ST. JOHN REGION. Routes.

From Houlton, Maine, to Fort Kent, which lies in the most northern part of Maine, and which is thickly surrounded by forests and woods, provides good sport. It is a distance of 99 miles running through Littleton, Monticello, Blaine, Presque Isle, Caribou, Woodland, New Sweden, Daigle to Fort Kent.

This route covers narrow gravel roads, but the scenery is very beautiful, running as it does into and along the St. John river.

SCHOODIC LAKE REGION.

Routes.

We find that in and around Foxcroft, Maine, one can find accommodations for good hunting. The run is from Portland to Augusta via Auburn and Lewiston and then on to Newport via Vassalboro, Waterville, Fairfield, Benţon, Pittsfield and on to Newport. You have then covered

a distance of 114.5 miles, and from which place run north to Corinna and Dexter into Hazeltons Corners, keeping straight ahead to Dover. From this point one may take the dirt road which leads directly to Schoodic Lake, or follow the state highway to Foxcroft, in all covering 136 miles of dirt roads. Instead of following this route, which is of course all state roads, one may take the dirt road leading from Orono, northeast of Bangor, into Schoodic Lake.

MACHIAS LAKES REGION. Routes.

Another good hunting section, other than the five mentioned, is the Machias Lakes region, which is one of the shore lying sections of Maine. Run along the coast from Portland, covering approximately 280 milés of macadam and dirt roads. From Portland to Bangor, a distance of 144.4 miles, keep straight ahead and along the coast via Falmouth, Yarmouth, Freeport, Brunswick, Bath, North Edgecomb, Damariscotta, Nobleboro, Waldoboro, Thomaston, Rockland, Rock-Nobleboro. port, Camden, Searsport, Prospect, Winterport into Bangor. From here run west into Brewer, East Orrington, North Ellsworth to Elisworth, a distance of 28

miles, thence on to Machias, going through Hancock, Sullivan, Gouldsboro, Steuben, Millbridge, Harrington, Jonesboro to Machias, and from here to the various lakes in that vicinity. From here one may continue to Calais, making a total of 280 miles. This, of course, covering Washington county, showing the eastern points of attractive country. There are short cuts to Machias and Calais over dirt roads, but we advise members to travel the above route.

The Caribou country is considered a wonderful sporting section of Maine and the route is included in that of the St. John series to Fort Kent, going through the Aroostook county.

WHERE TO GET HUNTER'S LICENSES.

For non-resident hunting licenses:

Aroostook County, Maine.

Ashland, F. G. Webster, H. B. Barker & Co.; Benedicta, B. A. Gantnier; Houlton, Elmer Churchill; Island Falls, Geo. H. Donham; Masardis, E. J. Mathews; Oakfield, F. H. Stimson; Oxbow, Libby Bros.; Presque Isle, H. R. Pipes; Smyrna Mills, J. E. Tarbell; Stacyville, O. Ross Brown; Stockholm, Lewis Anderson.

Penobscot County, Maine. Bangor, Bangor House, A. H. Benner; Grindstone, J. L. Robbins: Millincket, W. Herbert St. John; Norcross, A. F. Fowler; Old Town, W. C. Mutty; Patten, H. P. Gardner, E. F. Fowler, F. R. Bailey, D. L. Armstrong

Piscataquis County, Maine. Brownville, C. E. Herrick; Greenville, H. A. Sanders, Jr.; Greenville Junction, A. A. Crafts, R. W. Kitridge; Guilford, John Scales; Katahdin Iron Works, Mrs. A. L. Green; Kineo, C. A. Judkins; Kokadjo, W. I. Hamilton; Milo, Walter E. Dillon; Monson, Roy M. Hescock; Moosehead, A. J. Wilson; Northeast Carry, T. B. Snow; Onawa, E. F. Drew; Sebec Lake, B. M. Packard, Schoodic, C. P. Revnolds.

Out of State Agents, New York Sporting Goods Co., 15 Warren St., New York, N. Y.

Iver Johnson Sporting Goods Co., 155 Washington St., Boston, Mass.

Kirkwood Bros., 23 Elm St., Boston. Mass.

Wm. Read & Sons, 364 Washington St., Boston, Mass.

Bob Smith, 75 Federal St., Boston,

Emergencies --- What They Mean

OTORISTS are often confronted with meaning of the word "emergency,"and it might be well for the average motorist to know just what the word means. According to the learned, it means a situation or unexpected happening or occasion for action, caused by a perplexing contingency or complication of circumstances. Motorists in every day life may not recollect this definition, but to the average motorist an emergency becomes clear when pedestrians or persons in vehicles find themselves in a perilous situation in consequence of their own or others failure to fulfill legal and moral obligation. They see it when pe-destrians become frightened at an approaching machine, when they take the wrong course, when they run in front of automobiles, or hesitate, and seesaw after they have placed themselves in positions where injury seems inevitable.

The law that has come down to us from the learned English judges is that if I place a man in such a situation that he must adopt a perilous alternative, I am responsible for the consequences. On the other hand, if an injured person's act resulted from the rash apprehension of danger which did not exist, and the injury which he sustained is to be attributed to rashness and imprudence, such a person is not entitled to recover in

Now what is the duty of a motorist in an emergency?

This is what one learned court has to say upon the law governing the drivers of motor vehicles:

"The law as to drivers of motor vehi-

cles is no different from that which governs other persons. The standard required is that of a reasonable prudent person under all circumstances. If some unforeseen emergency occurs, which naturally would overpower the judgment of the ordinarily careful driver of a motor vehicle, so that momentarily or for a time he is not capable of intelligent action. and as a result injury is inflicted upon a third person, the driver is not negligent. The law does not require supernatural poise or self control. But no one safely can drive motor vehicles amid the distractions and dangers likely to be encountered on the modern highway and street who is not reasonably steady of nerve, quick in forming an opinion and calm in executing a design.

It is the duty of a driver always to exercise forethought, wisdom and caution.

It is his duty to anticipate that pedestrians and others in perilous situations might be filled with and overcome by fear and act unreasonably.

It is manifestly his duty to prefer the safety of human beings to that of animals, and to hit an animal rather than a human being, if the emergency demands such action.

It is his duty not to get rattled, and it is his duty to at all times operate his vehicle, not on the assumption everyone shall look out for him, but rather on the assumption that he shall look out for them, as more of a burden is placed upon him because of the character of the vehicle he operates than upon those not similarly situated.

CREATION OF MUNICIPAL TRAFFIC BOARDS.

If there is one problem requiring very serious consideration in these United States of America it is the control and efficient regulation of traffic in our municipalities. Everywhere is heard the hue and cry against traffic congestion: and yet outside of one or two centres little or no attempt is being made to handle this problem in a big way such as these big municipal problems have been solved in the past.

It is gratifying, therefore, to see the city of New York taking up the matter in a serious manner, and it is hoped that other cities and towns may follow the example set by New York.

The plan is to create a traffic board or commission composed of experts in matters of traffic, who are empowered to investigate the entire traffic situation and develop and report comprehensive plans to meet present and future traffic requirements. It shall consider: (1) Traf. fic regulation and other means of increasing the capacity of existing streets. (2) Means of separating grades at important intersections, elevated roadways for through traffic, two-level streets, street widening and new streets. (3) A complete system of auto and trucking throughfares for the five boroughs with special reference to the linking up of the burroughs and to the linking up of the city as a whole with neighboring centres in Nassau and Westchester counties and in New Jersey.

Chalmers Beats the National Express.

Chalmers Record Speedster beat the National Express, one of the fastest Baltimore and Ohio trains between Washington and Baltimore, over a three-mile course, a few days ago.





PLATE XI.

GARAGE WITH SHOP FOR THE HOME MECHANIC

Easily Erected Structure Will Take Four Cars Under Its Roof and Has a Separate Section For Repairing Equipment.

Designed by the Architectural Department of The Automobile Journal Publishing Co.

ANY motorists with a mechanical trend of mind have cherished in their hearts a wish for a little garage where they have their own repair shop and do all their own work, as well as a little on the side for neighbors. Such a structure can be erected much cheaper than one would suppose, and the one made the subject in the architectural department this issue provides ample space for four cars, enabling the owner, if so inclined, to secure a sufficient income from his investment to pay for housing his own car, as well as interest, and also the overhead for his machine shop.

In small communities, or in the suburbs where there is considerable work for a mechanic on cars, but not sufficient to warrant the maintenance of a permanent repair shop and garage, such a structure with its equipment is an excellent investment for the man who can repair automobiles for himself and others.

The building is of a permanent substantial type, but not costly to erect or maintain. On a concrete foundation 33x25 feet, set in the ground about 31/2 feet and extending above level about six inches, a wooden frame is erected of 4x6 sills, 2x4 studs, 4x4 plates and 2x10 rafters. The frame is boarded in with novelty siding and the roof covered with 3/8-inch boarding on which a Rubberoid roofing is laid. A brick chimney with cement capping is shown. This rises at the rear end of the building and from the boiler room. The front of the building, containing two openings, each eight feet wide and closed with two swinging panel doors set with window sashes in upper panels, is carried up above the peak of the main roof at the centre and is shouldered off to the ends. The false part of the front is made of wood and put on to improve the appearance of the building, as is also the girting and sawed rafter ends.

A concrete floor is laid at grade and for a depth of several inches below and before it is laid provision should be made for the entrance of the various pipes and conduits that are necessary in establishing the drain and feed connections for the water and lighting systems. The base of the floor may be laid of the same coarse mixture used in the foundation walls, but it should be surfaced with at least an inch of smooth cement.

A closet and sink are installed in the garage part and in the rear, occupying a space 12x16 feet, is the machine shop, boiler room and toilet.

As shown by the plan the room is laid out for the convenient installation of a lathe, work bench, upright drill and emery wheel stand. The work bench sets beneath the three windows in the rear and the lathe under the battery of four windows on the side giving ample light in the day time.

Ample space is allowed on the floor between either wall and the lathe for the placing of a gasoline engine for power, or above the lathe when an electric motor is used. The extremely large entrance to the machine shop permits the running of an automobile into it for special repairs.

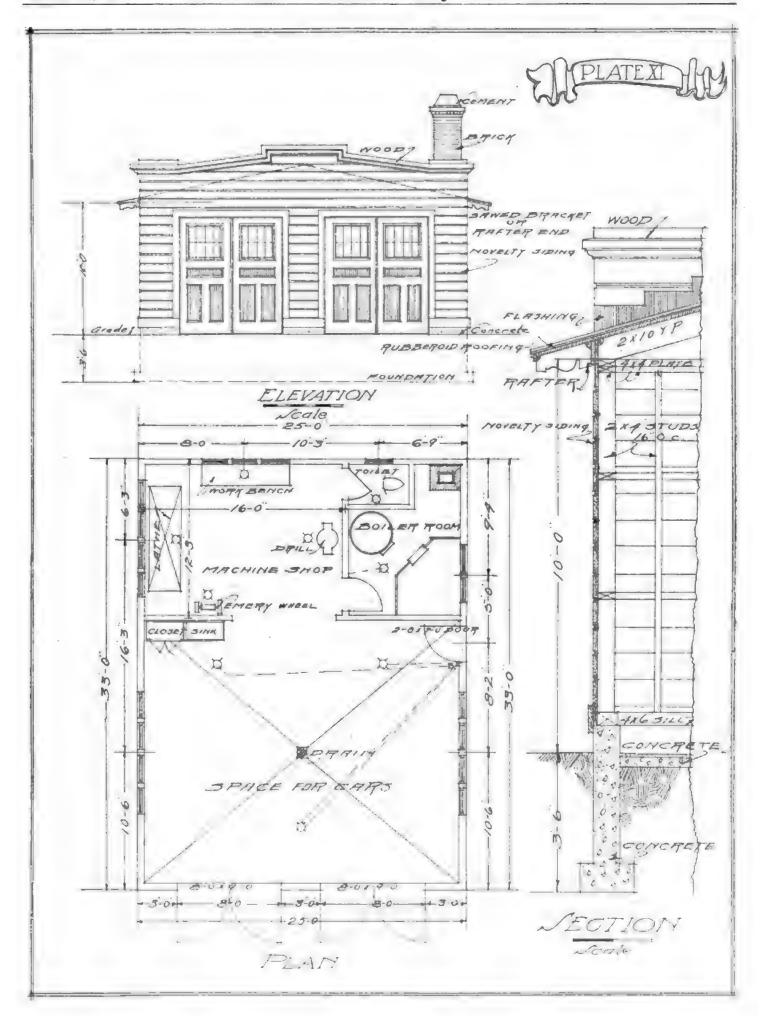
With this arrangement, lifting devices, such as chain falls, block and tackle, etc., may be suspended from the machine shop roof and used for removing engines and transmissions from cars and for lifting heavy parts into and from the lathe and drill press, thus obviating the necessity of having similar apparatus in the storage room.

The boiler room is amply large for installation of a small heating system, using either steam or hot water, and provides for a commodious coal bin. For a practical garage and repair shop an efficient heating system is very essential and will pay for itself many times over in keeping the cars in order, as well as in comfort and satisfaction to the owner. It will also aid the owner in securing customers, as any owner prefers to have his car in a comfortably heated garage in the winter, as he knows it is secured against all the ills of freezing and that when he wants to use it in the morning he will not experience any of the troubles resulting from permitting car to stand in low temperatures. With a drain in the centre and an overhead water pipe to feed the washing hose, the owner can give the same service as can be obtained from the most pretentious garage.

When casting the floor it is a good plan to have the dimensions of the bases of the lathe, emery wheel and drill so that timbers can be sunk into the wet cement in the proper places to receive the lag screws with which these machines are held in place.

The entire structure can be erected by a carpenter and mason, excepting the doors and window frames and sashes, which can be purchased cheaply from a supply house.

With the materials purchased at prevailing prices and excluding the equipment, this garage may be erected for \$250 to \$400. Materials were purchased this fall in Rhode Island for a counterpart of this garage for \$290.







Guides on the Automobile War Tax Rules

The National Automobile Chamber of Commerce, through Alfred Reeves, General Manager, has announced that through courtesy of officials of the United States Treasury Department it has secured certain rulings relative to provisions of the war revenue act as it affects the automobile industry. These are set forth in the following bulletin. Statement is made that these are tentative and subject to changes, but they will serve to guide the manufacturers and dealers until official and formal rulings are promulgated, possibly before the end of November, when the taxes must be paid:

Manufacturers' Tax-Manufacturers selling new automobiles, including trucks, on and after Oct. 4, 1917, pay a tax of three per cent. on the manufacturer's seli-

ing price.
2. The tax is levied on the price the 2. The tax is levied on the price the manufacturer receives for the car—not the list price, unless actually sold for that. When the price is paid part in money and part in other considerations (a second-and car), the tax is levied on the price and not on the actual cash received.

3. Charging the Tax to Consumer—If

the manufacturer passes the tax on, the Treasury Department believes that the price the manufacturer gets for the car (which is the basis for the tax), should (which is the basis for the tax), should include the present price of the car plus the tax collected. For example, if the manufacturer sells the car for \$800, plus the war tax, \$24 (or makes his selling price \$824 with no.reference to the tax), the government will assess the tax of three per cent, on \$824, which is what the manufacturer receives in making the sale.

Thus, for the manufacturer to receive the Thus for the manufacturer to receive the full \$800 for his product plus the war tax, his billing price would have to be \$824.74, of which three per cent. or \$24.74 would be paid to the government, leaving the manufacturer his \$800 net. The manufacmanufacturer his \$800 net. The manufacturer's present price, would, therefore, be \$7% of the total charge to the customer. This would appear to be a tax on a tax, but the Treasury Department rules that the tax is on the gross amount the manufacturer receives in making a sale and the tax is a part of that amount, even though later it is and over to the revergence.

later it is paid over to the government.
4. Floor Tax-Wholesalers, or cobined wholesalers-retailers, holding new automobiles, including trucks for sale at the opening of business Oct. 4, 1917, are taxed 1½ per cent, on what was paid to the manufacturer for the automobiles in question. However, the wholesaler, and wholesaler-retailer, are not taxed on automobiles sold and delivered prior to May 9, 1917, where title has been retained as security for payment of purchase money. · question. The dealer who does a retail business and The dealer who does a retail business and also a wholesale business is subject to the tax as a wholesaler on all the new automobiles held on Oct. 4, 1917, irrespective of whether they are subsequently to be sold at wholesale or retail.

5. Second-Hand Cars Are Not Taxable—The treasury officials finally reached the

conclusion that second-hand cars are taxable under the act, whether held by manufacturers or wholesalers. 6. Chassis Taxed—Chassis are consid-

ered automobiles and therefore are tax-

7. Contracts Prior to May 9, 1917—The above taxes are collected from the seller of the car, except in the following cases: of the car, except in the following cases:
If the manufacturer, wholesmier or wholemaler-retailer, sell a taxable automobile
to a dealer under contract made prior to
May 9, 1917, then no matter what the contract has to say about the taxes, the dealer who buys the automobile must assume the tax and pay it over to the seller, who in turn will pay the tax to the govern-

ment.
8 Conditional Sales—When an automobile was delivered to a purchaser prior to the date of the law, on a conditional sale contract by which the seller retains title to the automobile as security for the pur-chase money then the sale is made when title is passed. Such a sale is taxable if a simple sale between the same parties on the same date is taxable. (See exception in naragraph seven, relating to sales before May 9th.)

When an Automobile is Sold-The manufacturers' automobile tax accrues when the automobile or truck is soid. The question of when an automobile is sold is governed by the usual rules of law and of commercial acceptance, to wit: That the sale takes place when title to the mer-chandize passes to the buyer, that such passage of title may occur either by the physical transfer of the property or the bill of lading representing the same, to the purchaser or to the agent of the pur-chaser, and that, therefore, title passes when the merchandise is delivered to a carrier who is the agent of the buyer or the bill of lading is put in the mail (the postoffice being custodian of the pur-chaser), or when the bill of lading is delivered to the bank representing the purchaser.

10. Chattel Mortgages—Car delivered with a chattel mortgage is a sale when title passes and not when the mortgage is paid off.

11. Selling Cars to United States Gov ernment.—The Treasury Department will probably rule that such automobiles or trucks can be relieved from the tax under section 3464 of the Revised Statutes. Under that provision of law the government has been purchasing, without levying any tax upon the seller, various articles which, in terms, are taxed under different internal

revenue provisions of law,

12. Procedure-The seller, to avail himrice trocedure—The seller, to avail himself of this provision, should, before he delivers the merchandise to the government, have the branch of the government which is purchasing the article make application. plication to the Treasury Department for an order releasing these articles from the tax. Unless such order is obtained it would be necessary for the seller to add the tax to the cars or trucks sold to the government. Companies that have con-tracts with the government now for supplying merchandise without a provision for passing the tax should make the above application immediately.

13. Sales to Foreign Governments Tuxable-Motors, cars or trucks sold to for-eign governments are taxable. In the case of cars sold to foreign branches, where the branch is a separate identity, the tax accrues as usual when the sale is made to the branch; otherwise tax does not ac-crue until the sale is made by the foreign representative or agent of the manufac-

turer.

Branch House Stocks-If the socalled branch house is a distinct and separate corporation from a manufacturer's corporation, even though the manufacturer holds the majority or the whole of the branch corporation stock, then the manufacturer is not liable for any taxes

incurred by the branch.

15. Extras Shipped with the Car—The Treasury Department rules on the question of extras, that when such extras are tion of extras, that when such extras are shipped with the car and make one sale, the manufacturer shall pay the tax on the full amount. If the car is shipped, regular, however, and a set of wire whoels purchased extra, or another body, such extras would not be taxed.

16. Plan of Averaging the Tax so All

Final Buyers Pay the Same Amount—The Treasury Department does not look with disfavor on the plan of averaging the tax so that the amount of tax paid by the ul-timate buyers of a certain type of car shall be the same, irrespective of the sliding scale of discounts allowed various classes of dealers. They agree that it would be fairer to the retail buyer. The

department is interested in the tax which. the manufacturer pays on his car sales and not on the form in which he passes it tothe ultimate consumer. To avoid misrep-resentation the ultimate purchaser should not be billed with an item labeled "War unless it is the exact amount. There is no objection to the billing being marked "To Cover War Tax" and a sum charged. on each car to go through all transactions, and the total of which at the end of the year will be approximately the amount which the manufacturer has to pay to the

government.
17. Don't Establish Improper Precedents—To avoid establishing improper precedents in doubtful cases, inform party from whom you collect a tax that you are in doubt and that as soon as the government makes official rulings you will return any unwarranted collection.

18. Making Reports-In making return. to the government, list all articles that are taxable and make payment thereon.
On articles as to whose liability for taxes
you are in doubt, make a separate returnto the government stating reasons why to the government stating reasons why you believe they are not taxable. Do not pay tax on this class unless ordered by the government. This policy will give the government all needed information and will protect you from any penalties.

19. Time for Paying Taxes—Your local collector of internal revenue will supply information as to the time and mode of making returns and paying taxes. Whole-salers should make their returns on the floor tax, with checks covering the proper-

amount, before Nov. 2, 1917. The payment may be extended to a date not exceeding seven months from the passage. of the act, upon the filing of a bond for the payment. This bond shall be in a penal sum of not less than double the amount of the tax and ir. no case less than \$1000. Your Liberty Bonds will be accepted at par, covering the amount of taxes involved instead of double as re-

taxes involved instead of double as required if a surety bond is given.

20. Manufacturers' Returns—Manufacturers should make reports, with checks for the proper amount, on their Octobersales any time before the end of November. After that they make monthly re-

General situations may be referred to us for the attention of our counsel or for submission to the Treasury Department, but specific cases, involving details of a particular transaction, should be first sub-mitted to your own counsel with the

Show Calendar

New York, national automobile showJan. 5-12 Washington, D. C., carnival and open house week.....Jan. 11-18 Montreal, Can., national motor showJan. 19-26 Chicago, III., national automobile showJan. 26-Feb. 2 St. Louis, Mo., manufacturers' and dealers' show......Feb. 11-16 San Francisco, Cal, automobile showFeb. 16-26 Boston, Mass., Boston Automobile Dealers' Association show, Mechan-









Dyke's Automobile Encyclopedia Issued

Sixth Edition Proves Notable Addition to Popular Hand Book and Well Indexed.

DYKE'S AUTOMOBILE AND GASOLINE ENGINE ENCYCLOPEDIA. By A. L. Dyke, E. E., St. Louis: A. L. Dyke, 1916. Sixth edition; 900 pages; illustrated. Price \$3.

THE sixth edition of this popular, practical book, treating on the principle, construction, operation, repairing, troubles and remedies, has appeared, much larger and better than any of the excellent editions which have preceded it. While not strictly a cyclopedia, the compilation of information on the subject is so comprehensive and exhaustive in detail that it constitutes one of the most complete reference works on automobiles thus far published.

In bringing out this new edition Mr. Dyke has packed into its 900 pages concise, valuable information for any one interested in any branch of motoring, made all the more valuable by his draft on his 21 years of experience in the automobile business as a supply man and publisher. From his first modest booklet, published in 1900, to the present issue, the intimate knowledge of his subject has been the mark of superiority in these books. The present issue is made the more valuable to any one who consults it by the fact that it contains 6000 lines of index, thus enabling the reader to find his topic readily. Any subject, trouble, remedy or repair, can be found in this index, and this detail alone deserves the thanks of the student or casual consultant. In addition, throughout the book gives its constant evidence of painstaking care in collation of material.

Its values as a text book are recognized in the fact that 5% of the leading automobile schools in the country use part of this book in their classes to teach the fundamental principles of assembly of a car, engine principles and construction, valve timing, ignition and carburetion points.

To the beginner this book furnishes opportunity to learn the fundamental principles of each and every part of an auto mobile from the engine to the axle. All cars are treated in a uniform way, leading the student to a mastery of the principles of the parts first, with explanations of the deviations of construction afterwards. Complete specifications of all cars are given so the reader will understand the variance of construction of the different makes of cars.

Before taking up the subject of repairing and adjusting, one learns the principle and construction of all the parts and then step by step is taken through the subject of adjusting and renairing. Other instructions cover such subjects as: How to build a repair show for home or business; how to equip the shop from small tools to regrinding cytinders. Tire re-

pairs, welding, battery charging, etc., are thoroughly treated. One is then taught how to use tools; how to cut threads; to distinguish S. A. E. and U. S. S. threads; how to use and read measuring instruments; how to solder, case harden, repair radiators; how to redesign old cars; how to straighten frames, fenders, etc.

The instructions on ignition systems cover the entire field and in a simplified manner that anyone can understand. The instructions on the electric starting, generating and lighting is simplified with hundreds of clear illustrations of diagrams. There are 775 illustrations and 279 pages to the electric subjects in the book, including the storage battery and ignition subjects.

In addition to the book there are two supplements on the Ford and Packard with 332 illustrations and 91 pages, part printed in two colors. There are also five colored inserts and a dictionary.

Supplement No. 1 deals with the Ford, of which there are 59 pages and 307 illustrations. Such subjects as how to get more miles per gallon; how to overhaul a Ford; how to make a Ford do 60 miles per hour; how to convert a Ford for commercial use; how to construct a combination body; how to construct a Ford racer; "fine-point" adjustment, etc., are dealt with in the Ford supplement.

Supplement No. 2 treats on the Packard twin-six, giving a complete detail description of this multi-cylindered car with many two-colored illustrations, its principle, and adjustments simplified.

The inserts illustrate the subject o' different makes of engines, as the Continental, Franklin, Haynes, Sterling, Wisconsin aviation engine and many others.

A feature of the inserts is that of a four-cylinder engine, illustrated with blank space for the student to draw in the parts, in order to more clearly understand just where the various parts of an engine are located and the relation of one part to another. The address of the publisher is A. L. Dyke, Granite building, St. Louis. Mo.

Kelly-Springfield Co. Has Record Month's Sales

September Gross and Net Earnings Reported as the Largest in Company's History.

The Kelly-Springfield Tire Co. reports the largest gross and net earnings for the month of September in its history. It is expected that the company will be able to put away a surplus of at least \$1,500,000 this year after allowing for the usual dividend on the preferred stock and the regular \$4 dividend on the common.

The company has been nearly 50,000 tires behind orders at times this year, but this shortage in production will be more than met as soon as the big plant at Cumberland, Md., is finished, which will enable an increase of 400 per cent, in the output.

Standard Steering Co. Completes Big Plant

Cleveland Concern Announces Also a Specialized Organization Pushing 1918 Contracts.

The Standard Steering Wheel Co., Cleveland, O., announces that with the completion of its plant and an efficient organization the company is specializing in the manufacture of steering wheels for automobiles, airplanes, motor trucks, tractors and motor boats. The company is contracting for 1918 deliveries.

A special catalogue of the company's products is ready for distribution.

OXY-ACETYLENE WELDING TURNS WASTE INTO PROFIT.

"Turning Waste Into Profit" is the title of a new book just issued by the Prest-O-Lite Co., Inc., of Indianapolis, Ind. It is devoted exclusively to the possibilities of reclaiming broken and worn machinery and metal parts for service by the oxyacetylene process, and is the most complete and comprehensive book ever issued on this subject. Containing 82 illustrations, it pictures and describes representative examples of reclamation welding work in practically every field of the industrial world.

In the face of present high prices and scarcity of metal equipment, the subject of welding is receiving more than usual consideration and this new book is truly a beacon to plant owners interested in the efficiency of holding down the "scrap heap." It is mailed to any interested executive upon request.

"SERVICE THE SUCCESSOR TO SELLING" HYATT.

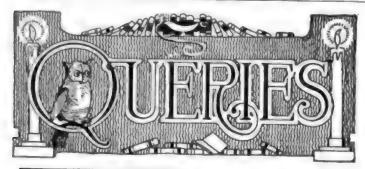
The Hyatt Roller Bearing Co., Detroit, Mich., has issued a neat little folder, entitled. "Sertice the Successor to Selling," explaining the company's policy of backing up its products with real service to manufacturers, dealers, salesmen and the general public.

"Such is our conception of service," says the writer, "the Hyatt company is glad to have it known that it freely renders such aid, and would be proud to demonstrate how thorough it is and how useful it might be to you."

LIST OF PRODUCTS OF THE DU PONT COMPANIES.

A neat little booklet, vest pocket size, has been issued, containing a list of the Du Pont products manufactured by the E. I. Du Pont de Nemours and associated companies, including the Du Pont Chemical Works, Du Pont Fabrikoid Co., the Arlington Co. and the Harrisons, Inc.;

The booklet will be sent-upon application to the home office at Wilmington, Del.



NOTICE TO READERS.

His department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars, do not healtate to lay your troubles before him. He will answer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should always be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

HOW DO YOU LOCATE COMPRESSION LEAKS AND WHAT GASKETING METHODS DO YOU ADOPT ON THE INTAKE SYSTEM?

To the writer of the best answer to the above question \$2.50 will be paid. For the next best answer \$1 will be paid. The best answers received will be published in the second issue after the appearance of the question in the magazine. Answers to the question should be in the hands of the editors by the 18th of November. The contest is open to every one.

HIS ENGINE STARTS HARD. (F. F., Kutstown, Pa.)

I am having trouble starting my engine in the mornings when it is cold. After it is heated and during the day time it starts easily and runs well. Can you give me advice on this matter?

It would seem as though the trouble might be located in the carburetor or intake line, and we would suggest that you go over these parts systematically as outlined herewith.

For proper gas supply it is essential that the intake manifolds, as well as cylinder connections and valve bushings, are absolutely tight. Start the engine and let it run until it has warmed to operating temperature; do not let it race, but run it at normal speed in all tests.

Obtain an ordinary oil can (squirt can) and fill it with gasoline. With the engine running squirt a little gasoline around each of the spark plugs in succession. If bubbles are formed, or the engine speed is increased or decreased, it is an indication of leakage, which should be stopped. Before testing the next plug wipe off surplus gasoline. Test all of the plugs, all of the intake connections, around the valve stems and the joint between the carburetor and manifold in this way. Any change of engine action, either retardation or acceleration, is indication of leakage, which must be stopped. New gaskets at the intake manifold connections, new valve guide bushings, or new gaskets on the carburetor connection are the remedies used for leakage of this kind.

The next step is the valve adjustments. Adjust all of the valves or push rods so that the clearance between the valve stems and push rods is not over the thickness of a visiting card while the engine is warm.

Carburetor adjustment is the next thing to be considered.

YOU SEE

the hottest, quickest, best timed spark you can get is none too good in view of the low grade fuel you are now forced to use.

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To install: Merely remove present glasses and insert

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7½-8% dinmeter, in inches, per pair. \$1.56
8%-9½ diameter, in inches, per pair. 1.75
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and air adjustment is turned as far as possible to the left. letting engine idle smoothly and accelerate quickly when throttle is opened.

FITTING PISTON RINGS. (R. M., Cambridge, Mass.)

When piston rings come from the factory are they all right and fitted so that they will fit the cylinders? Someone tells me that the rings should be lapped or ground into place and fitted on the ends. is this so? How are they fitted and ground?

Very few piston rings, as they come from the factory, are fitted so as to give their full efficiency, and in many cases, if they are not fitted to the particular engine in which they are to go, they will give very unsatisfactory results.

The first step in fitting rings is to see that the piston ring grooves are clean and do not have a deposit of carbon in the corners. When rings are fitted they should be adapted to the place where they are to go and it is essential that they be placed in the same location to which they were fitted.

After the piston ring grooves have been thoroughly cleaned the ring should be "rolled" around the groove. In this way the width of the ring and width of the groove can be compared. Should the ring bind at any point it should be cut down with emery cloth. For this purpose tack a piece of emery cloth on a flat board and carefully rub the ring back and forth across it until the required thickness is had. The ring should fit the slot with a very slight amount of play or it will bind when it is heated.

The next step is the cutting of the ends to fit the cylinders. Slip the piston ring into the cylinder about two or three inches with the bottom of the ring parallel with the bottom of the cylinder. The ends should be against each other. As a general rule the ring is left long when furnished by the factory, to make up for cylinder wear. The ring slot must be filed until the ends are flush with each other, with no clearance and the sides parallel.

The ring may then be put on to the piston or upon a pine block of wood, preferably the latter, which is fitted with a groove and clamping device for holding the ring solidly. The inside of the cylinder is then coated with Prussian blue, and the ring slipped into it. Upon the withdrawal of the ring the high spots will be coated with the blue. A very fine file or emery cloth may be used for removing the high spots, the blue wiped off and the process repeated, until an even coating on the ring indicates contact at all points with the cylinder.

After the ring has been fitted to the cylinder it should be taken from the piston or wood block and again slipped into the cylinder. The ends of the ring should then be examined and given a certain amount of clearance or the ring will jam in the cylinder when it is heated. The clearance between the ends of the ring should be between .004 and .006, depending upon the size piston.

The ring should then be put in place on the piston and given a good coating of oil. After all of the rings have been fitted in this manner they, as well as the cylinders and pistons, should be well oiled before being assembled. If this is not done the cylinders may be scraped, since there is an interval between the starting of the engine and the time when the oiling system becomes operative.

HUDSON STARTING SYSTEM. (H. B., Detroit, Mich.)

When I pull out the ignition button on my Hudson Six car I notice a buzzing sound, which seems to come from the motor starter. Is the ignition connected with the starter and how does it effect it?

To understand more fully the action of the Delco system, let us explain the construction of the motor generator. This unit consists of an armature, which is connected on one end (rear) with a train of gears that are only meshed with the flywheel when the starting switch lever is held in the extreme forward position. The armature is fitted with two commutators and two sets of brushes; those on the front end rest against the commutator at all times, while those on the

Friction starts **Grinding** before Grease begins Lubricating

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NON-FLUID OIL lubricates the second your car moves from rest-and every minute it is in motion. Doesn't give friction a chance to start. It never melts, never leaks out, is much purer and longer lasting than any grease you can buy.

If you buy lubricants on the same basis that you buy tirespurely on service, you'll ask for NON-FLUID OIL every time. Get "K-oo Special" grade for pears; "K-ooo" grade for bearings. Sold at your dealers in grange-colored cans only.

> Write for a free booklet, "Lubrication of the Motor Car.

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ADAMSON MFG. COMPANY

EAST PALESTINE

OHIO

rear press against the commutator when the starting switch is down.

At the front of the armature shaft is a clutch arrangement, which connects the armature shaft with the pump shaft, but allows the armature to run faster than the pump shaft when the unit is acting as a motor, for starting the engine.

With the engine at rest the train of starting gears are not meshed with the flywheel, neither are the brushes of the motor end against the commutator. When the ignition switch is pulled out current passes from the battery through the armature (generator end) and causes the armature to revolve slowly. If this were not done the gears might not mesh properly when they were brought against the flywheel.

The starting switch lever is then pressed forward. At the beginning of the movement the train of starting gears are meshed, then the generator circuit is broken, and finally at the extreme forward position of the starting switch both motor brushes are brought into contact with the commutator drawing the current from the storage battery and causing the armature to revolve as a motor.

As soon as the starting switch is released the brushes on the motor commutator spring away from contact and the gears unmesh. The generator circuit is again completed and the water pump shaft drives the armature.

OVERHAULING THE CADILLAC. (Continued from Page 16.)

the clutch discs. The nuts on the end of the stude of the front plate retainer may then be removed and the nut on the big bolt backed off.

The ball release bearing is retained on the clutch spider by a spring split ring, which may be pried off with a screw driver if necessary. In assembling the clutch it is a good plan to put the discs in place inside the large driving flange. leaving them there until the large bolt has been loosened and the clutch plates locked together by the spring pressure.

Work on Transmission Members.

After the control rods have been disconnected the transmission cover upon which is mounted the gear change lever may be taken off. The six bolts which fasten the universal joint to the transmission shaft are next taken out, releasing the transmission, which may then be removed from the car.

If the car is of the later models the tire pump should be removed at this point. The two ball bearing races upon which the transmission main shaft is mounted are retained by caps, which are fastened by cap screws. These caps should be removed and the outer ball races driven out of the housing from the inside. With the bearings removed the main and clutch shaft with gear attached may be taken from the gearset.

The countershaft is held in place by a cap on each end, directly beneath the main shaft, and when removed the gears. together with the roller bearings, may be taken from the housing.

The rear axle, together with the differential and drive shaft, may be removed, without disturbing the housing or wheels. First remove the wheel hubs exposing the axles which drive through spiders and may be drawn from the car.

The flange which attaches the drive shaft housing to the rear axle housing should next be removed, bringing with it the drive shaft, universal joints and differential assembly.

After the rear universal joint has been disassembled and the nut removed from the pinion gear shaft, the universal joint flange may be pulled from the pinion shaft. The front roller bearing is fastened into place by a cover plate, which may be removed and the bearing taken out for examination.

Examining Differential Assembly.

The pinion gear is made integral with the shaft and removed from the rear after the differential assembly has been taken out. The differential assembly is mounted upon two bearings, one on each side, which are fitted with adjusting nuts. Remove the two caps which are bolted to the housing, releasing the bearings and adjusting housings together with the differential. This applies to models 55 and 57. The outer races of the roller bearings are adjustable by two sleeves, which are threaded into the housing, the sleeve on the front

(When Writing to Advertisers, Please Mention The Automobile Journal.)















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plus. It means brains plus experience plus limitless resources. It means a company with ample experience, ample organization, ample prestige and more than ample financial resources to meet any emergency.

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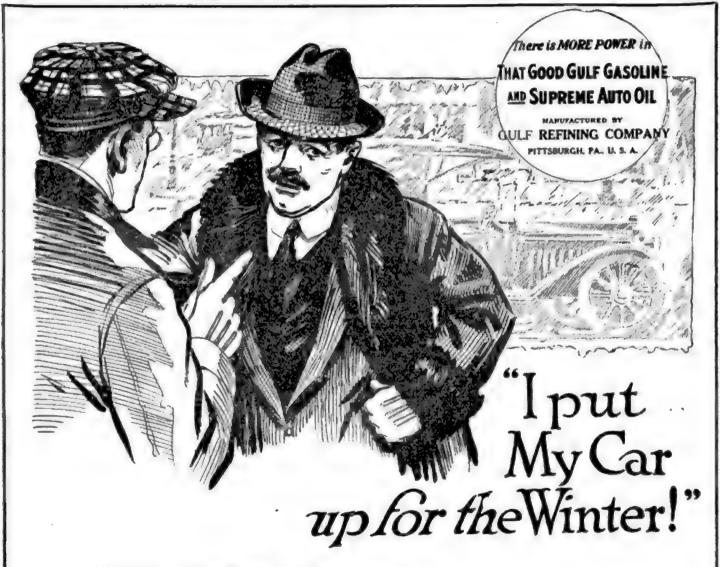
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A NTICIPATION is a rather long word, and so is preparedness. There is an old saying, too, that an ounce of prevention is worth a pound of cure. These long words and the old saw, however, point a timely moral to all motordom. It seems to be wisdom and forehanded to look ahead a little by looking squarely at what is going on in the motor car industry, the trade and motoring. War demands are making inroads on the stocks of materials and some curtailment of production is to be expected. It is fortunate for the industry and fortunate for the public that big men are taking hold of the war Industries and war materials for a sane, yet patriotic adjustment of the supply of steel and metals. The automobile industry has risen to every demand on its resources, even to the point of yielding great factories to the government entirely, if necessary. Happily, the commandeering of supplies has been stayed for the time at least, and with prospects of a compromise for the entire period of the war. However, the spirit of preparedness would dictate that no motorist should let an opportunity go by to keep his car and equipment neat, strong and in good order. Men of affairs must have their cars. New cars will be bought and sold. More attention must be given to the salvaging of used cars and materials, and more intensive use made of cars and motor vehicles. Such efforts will help win the war, and they will be a distinct gain also to the individuals and firms who follow such a course.

THE National Automobile Association calls the attention of members to the wisdom of reporting to the association counsel in every case of accident, as outlined in the section of this journal devoted to the news of this association.

NOV. 10, 1917. NO. 7. NTEN So the Country Went to War.... 7 And Used Cars Boom as Curtailments Are Planned. Adjustment of the Industry..... 9 Trade Outlet Announcement....10 Packard Service School......11 Overhaul of the Hupmobile.....14 About Tanks and Other Things...17 Oxy-Acetylene Welding......18 Miracles of Car Repair With Modern Salvage Tool. , Latest Motor Fashions.......21 By Mrs. A. Sherman Hitchcock. National Automobile Association..23 National Highways Association..25 Good Roads Address by the Association President. Dispelling Used Car Illusions....27 Garages-Plate XII......28 Neat Stucco Garage for Housing One Motor Car. Accessories and Equipment.....30 Graphic Items of the Day......33 Coming Events......34 New Allen Series 41......37 General News of the Industry....38 Queries.....41 Advertisers' Index..... 2 -:::-Treasurer . . WILLIAM H. BLACK Secretary . . . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

S WINTER draws near the motorist finds it necessary to select equipment and accessories that will give himself and the occupants of his car the best of comforts when riding in the cold. There is stock to be secured for the garage, as well as heaters, robes and other paraphernalia for the car. Careful choosing needs to be exercised in order to get the most for the outlay, as well as superior quality and exceptional efficiency. In the next issue of the Automobile Journal the an-'nual review of winter heaters and equipment will be presented. This is an exceptional guide for the selection of just the right thing, as many satisfied readers have frequently attested of this feature for several years

THE garage design prepared by the architectural department of the Automobile Journal Publishing Co., for publication in the Nov. 25th issue, will be a two-story structure, with plans for a chauffeur's room on the second floor. The structure is artistic, roomy and well laid out for housing two cars. This two-story garage is a fitting addition to the series of garage designs regularly appearing in this journal, and of especial interest to those who build for permanence and adornment of their grounds.

WITH all that is going on preparations for the great national automobile should not be lost to view. The Automobile Journal show numbers this year will be filled with accurate, reliable data on the new cars, will tell who will be producing cars, parts, fittings, and where to get them, in addition to a vast fund of information on the new motor and body designs, constructional features and accessories. The first of these, the New York advance show number, will be mailed Dec. 25th.





ANNOUNCING TRADE OUTLET

Automobile Journal, Motor Truck, Accessory and Garage Journal, New Special Feature for Manufacturer, Dealer, Motorist and All Classes of Allied Service.

THE Trade Outlet, a new service feature, now announced by the Automobile Journal Publishing Co., incorporates in the advertising pages of three magazines, the Automobile Journal, the Motor Truck and the Accessory and Garage Journal, a distinct class of helps for all the readers of these journals, motorists, manufacturers, dealers or the thousands of workers in varied capacities in the trade and industry. Every reader is a buyer of some of the materials or service which are advertised in these columns.

The motorist may be looking for parts, equipment, make or model of car or accessories; the dealer is looking for used car parts; the manufacturer for materials and services, including individual services in all sorts of employed capacities—to mention most briefly the merest few of the thousand and one ends to be served.

The Trade Outlet is unquestionably the most unique, effective and economical market place in the world for everything connected with the automobile and automobile industry. It reaches 75,500 buyers, grouped in classes who are constant, shrewd and consistent purchasers of the materials and services that they need. Their needs never end and they are the one class of people on this great, busy earth who have constant communication with the horn of plenty. They know the value of a nimble dollar and have done more to keep money in active circulation in the past few years than any other class.

The readers of these magazines buy from one another and sell to one another. They have opportunity in the Trade Outlet to make their own bargains known and watch out for the other fellow's bargain offer.

The Trade Outlet reaches out its services to 25,000 garages, factories, service stations, repair shops, machine shops, accessory dealers and traders in the Accessory and Garage Journal. The Trade Outlet goes before 6000 truck owners and users, 1500 truck dealers and service stations in Motor Truck. The Trade Outlet goes to 35,000 owners of passenger cars in the Automobile Journal and 8000 car dealers, service stations, garages and repair shops in the Automobile Journal.

It is the superlative market place for anything that has value for new cars, used cars, parts, fittings, equipment, machinery, tools, accessories, supplies, and at extremely moderate rates.

Mutual interest directs attention to the Trade Outlet announcements. Long ago the advancements of modern advertising inculcated the lesson to never lay down the book without carefully scanning the advertisements. To motorists and all connected with the industry the materials and services offered from the first page to the last possess the keenest attractiveness and value. With their wide range of subjects, the Trade Outlet presents all the value of a classified section. A most pleasing variety is presented and the end of many a long and weary search for that one particular part, fitting, service or piece of equipment is resting in the announcements of the Trade Outlet.

Finally, reader, don't lay this copy down without consulting the Trade Outlet.

For rates and full information write today.

AUTOMOBILE JOURNAL PUBLISHING COMPANY,

Times Building.

Pawtucket, R. I.





a few years ago typified eccentric dressing. All the garments designed for the woman who motored possessed one quality in common-a total lack of beauty or amartness, but happily those Jays are in the past, and now motoring clothing is selected with quite as much attention to their smartness and becomingness as are any others.

Many of the new and smart motor coats are admirable examples of models which are suited not only for motoring, but for many other uses as well. Distinctive in cut they have unusual charm. To be clad in some of the lovely new wools, with trimmings of fur, is to give cold weather a warm welcome. Among the best grade of materials that combine the quiet elegance of quality with style Reindeer Cloth, distinctiveness are Gloveskin Cloth and Suede Twill. They are made in such delectable colorings, lovely browns and greens and bues and grays in their new shadings and with their new names and all with the soft bloom that the velvet finish gives to wool and that adds so greatly to the charm of any color.

Many Stunning Motor Models.

There are quantities of stunning motor models in these particular materials, both fur trimmed and without fur, while the fur fabric is being taken just as much for granted this winter as any other trimming, and there are wonderfully good imitations of chinchilla, Hudson seal, mole, broadtail and kolinsky that are really astonishing. Among the wool coats intended for all winter wear in the motor are models lined with plush or with fur fabric. This is an entirely new whim of Fashion's, but the cozy plush lining is vastly comfortable and has that soft and cozy feeling that the fur lined coat conveys. The Suede Twill is just what the name implies—a distinct twill with a suede finish. Lovely shades in this material are Artist brown, wine. Hague, Mysterious green, mole and prunelle. Reindeer Cloth is a beautiful velvety surfaced material and comes in Dreadnought Gray, Khaki, Havana, Covert, Russe, Taupe, Prelat and Amethyst. The Gloveskin Cloth has also the velvety surface with possibly a trifle more of a glow in its makeup. Charming colors are Lanvin red, beige, rose taupe, Marie Louise, mahogany, midnight blue and black. Of course these materials also come in the standard shades, as navy blue, tan, black and tete De Negre. Their wearing qualities are wonderful and at this time when war needs have made such a demand upon the woolen market we may consider ourselves very fortunate to be able to procure materials of such exceptionally fine quality. It is highly important at the present time that every woman should be most particular in her selection of both materials and garments and to make sure that they are of first class quality if she expects the service she should have. There are really only a few materials that could conscientiously be recommended in the wools that are purchaseable nowadava.

For the woman who drives her own

car there is a most excellent Leather Reversible Coat, made from selected sheep skins, lined in either gabardine or tweed material, which may be worn either side out. It has very smart style and will appeal to the motor woman. Another smart garment is the Brigadier, made of gabardine and lined with wool fleece and is detachable. It is thoroughly weather and wind proof, very light in weight, warm and durable. In style it is patterned after the coats which have been in use on the western front since the beginning of the war.

Dressy Closed Car Coats.

So many motorists use the closed car during the cold aeason that it is not to be wondered that the motor coat for limousine and sedan use is in high demand, and these coats must necessarily breathe an air of dressiness along with their practicability. Wraps of this character come on cloak lines and there are also seen some stunning evening motoring cloaks on the lines of the old fashioned circular and of those built after the capes used in the Italian army -some made very ornate with strappings of gold and silver braid The coats of this character are usually of Georgette Satin, a wonderfully well wearing material and beautiful in its appearance. This Georgette Satin has so many things in its favor that it is quite impossible to realize them all until one has owned some garment made from it and enjoyed the satisfaction derived from its use. The colors are lovely-coral, bisque, mignonette, canterelle, silver, Elsie blue, marron taupe, prunelle, Lauriers, arbre and Noir. These coats may be lined with chiffon velvet or satin veiled in chiffon. Even some cloaks of Georgette Satin are made unlined with the seams flatly tailored. In most instances there are large collars of fur and sometimes the fullness is loosely gathered at the waist and has a girdle of heavy silk cord.

Materials for Frocks and Wraps.

A smart little frock built especially for motor wear under the fur coat is of Milan green Kitten's Ear Crepe, which for elegance, durability and comfort cannot be excelled. The sleeves are long and tight fitting, while the unbelted straight front has its fullness held in at the back by wide black satin ribbon, which ties at one side in soft loops, and is finished with long silk fringe. Another is of Marine blue and is straight and loosely belted, its only trimming being buttons and silk tassels. The particularly attractive colors in the Kitten's Ear Crepe are Noir, Marine, Milan, Comete, Riviera, Chair, Ivoire and Pommier. Georgette Satin is also used with aplendid success for motor frocks.

A splendid wearing material, which possesses a rich, lustrous appearance and is ideal for either frock or wrap is the lovely new Waterside Corduroys. They come in all the new colorings and distinctly new wales. The Petuna is the very narrowest imaginable wale and is very soft and pliable. In beaver, Russian, fern. Tabac and taupe it is particularly lovely. One especially admirable

feature of value to the motorist is that the Waterside Cordurovs do not crease or wrinkle in the least. Any woman with motoring experience knows exactly what this means. Even after constant wear on a long distance tour this corduroy does not lose its freshness, something which can be said of very few materials. As materials form the entire base of our complete wardrobe, too much attention cannot be paid to their selection and it is not only well to know where to buy. but most important to know what to buy.

What do you think of the new Patricks for women motorists? The serviceability of these garments is unquestioned. The wool used in their manufacture is of unusual quality and comes from the northern sheep, which are given a thick, warm covering to protect them from the intense cold. The Patrick cloth gives great warmth with little weight and resists wind, cold and moisture excellently. They come in both plain colors and in plaided effects, combining sombre and gay forest shades.

Motor Dress Accessories.

The Florette veil is one of the new and distinctive patterns of the season, and comes in all the staple and new shades. It gives all the protection ordinarily necessary and also adds a dressy effect to the costume. In some instances the veils are attached to the motoring hats, but in the majority of cases they are bought as a separate affair and the choice is very wide. One of the new veils has a large hexagon mesh with the motifs so arranged that they cover one side of the face or fall against the chin or partly eclipse one eye. The new motifs are largely of flower design and among the most popular are the Bokay, Vixen, Shirley, Dania, Gloria and Sammy. These may be had in many smart shades to match the hat.

Motor Hoods Coming In.

The motor hood is coming into its own again and I have seen some charming models. One is of white fox fur, lined with violet chiffon shirred all around the face, and long ties of five-inch violet colored velvet ribbon. Where the ties were joined to the bonnet at each side was a cluster tiny velvet violets. Another model is of khaki colored duvetyn, edged with brown fox and tied with brown velvet ties. A hat of coral Georgette satin resembles in shape the high Russian head dress and has a cache-nex collar attached, which renders it particularly admirable for motoring. The satin drapery falls gracefully down to encircle the throat and ends in a bit of a twist on the left shoulder. A little round Chinese motor hat is built of caracul and has a cocarde and two stiff ends of bright blue velvet. A model, medieval with its conical shape and trailing veil of chiffon cloth derived from the hennin, is made of finely plaited Elsie blue Gorgette Satin. The crown climbs to a point from a narrow little brim and from the tip top springs a pompom of fur. The veil is attached in such a manner that it may easily be adjusted over the face or flung back if desired.



national army from the states of Georgia, Kentucky and Florida. Four miles south of the city is Fort McPhearson, where the German sailors are interned.

From Atlanta to Anniston the roads were found only in fair condition. Camp McClellan, at that place, is made up of the National Guard troops of New Jersey, Virginia, Maryland, Delaware and the District of Columbia. Returning to

Atlanta we followed a very fair sand clay and gravel road to Augusta. Camp Hancock is very nicely situated near the city and the National Guard troops of Pennsylvania, stationed there, find it very easy to come to town whenever permitted. This is one of the choice locations and the troops at Camp Hancock are envied by many of the troops of other camps.

Traveling over a very fair sand clay and gravel road, our next stop was at Camp Jackson, Columbia, S. C., where we visited the national army of Tennessee, North and South Carolina. This ended our cantonment tour and we returned over a very fair to good sand clay road through Camden, Cheraw, Pinehurst, N. C., to Durham, where we joined our southward route.

To Stop Reckless Driving of Automobiles

HE reckless operation of automobiles by men under the influence of liquor is increasing, according to the records of the Massachusetts Highway Commission, notwithstanding the severe penalties imposed by law. In a summary of deaths, injuries and accidents in which all types of motor vehicles were involved, for the first nine months of the fiscal year of 1915 and 1916 (Dec. 1 to Aug. 31, 1916, and Dec. 1 to Aug. 31, 1917), a total of 280 bersons were killed and 4752 were injured this year as compared with 176 deaths and 5763 injuries during last year. Among those injured or killed pedestrians take first rank, while occupants of motor vehicles come next. One hundred and fifty-six pedestrians were killed this year as compared with 38 in the same class during a like period last year. Deaths due to motorcycle accidents increased from nine last year to 22 this year. Six occupants of carriages were killed this year as against two last year. Injured persons far outnumber the dead in nearly every automobile accident. Pedestrians to the number of 2751 were more or less severely injured during the past

nine months, while 2944 were injured in motor vehicle accidents in the first nine months of 1916. In the motorcycle class 1033 persons were injured this year as against 1428 last year. In the bicycle class 471 were injured this year as against 601 last year. In the class of occupants of carriages 144 were injured this year, and more than twice that number—311—last year. Only six street car passengers suffered in the automobile accidents since last December, as against 26 the year before.

The greatest number of accidents occurred in collisions between automobiles; the next greatest number took place when pedestrians stepped from the sidewalk into the path of an automobile. There were 6192 accidents in this class in the last nine months as against 5164 for the previous period. In the person against the machine class there were 2885 encounters this year, while there were 2996 for the same period last year. In the carriage and automobile collisions there were 1112 last year and 740 this year. Between bicycles and automobiles there were 425 last year and this year 3196. Between automobile and

trolley cars 735 last year and 507 Between automobiles this year. and curbings, telegraph poles and the like there were 913 last year as against 711 this year. Between railroad trains and automobiles there were 22 accidents last year and 196 this year. Most of the automobile accidents occurred in the day time and in the larger cities and towns. Among the most serious accidents, however, are those which occurred at night on country roads. This class of accidents being more or less directly attributed to "joy riding."

The department is exerting every possible effort to stamp out reckless driving and the operation of motor cars by persons under the influence of liquor. During the three-quarters of the year 503 cases were prosecuted in the courts on the charge of operating a motor vehicle under the influence of liquor. In cases where reckless driving has been charged the department has had 200 persons prosecuted this year, while last year 292 were prosecuted for operating motor vehicles while intoxicated and 196 for reckless driving.

One hundred and sixty-four persons were prosecuted this year on the charge of using motor vehicles without authority, as against 83 last year on the same charge. On the charge of endangering the safety and lives of the public 193 were prosecuted this year and 115 last year, and in cases where motorists were charged with failure to stop after injury, 85 persons were prosecuted this year, as against 52 last year.

That the highway department is in earnest in its aim to rid the highways of reckless and drunken drivers there is no better evidence than the fact that last year there were a total of 678 of the department's prosecutions as against 1152 this year.

General Counsel's Letter Box

E HAVE received the following letter from the chief of police of Newton, Mass., whose plea we earnestly commend to the serious consideration of all motorists:

Nutional Automobile Association. 9 Park Street, Boston, Mass.

Gentlemen:-

My attention has been called to the large number of automobilists who do not comply with the law, which requires the rear number plate to be properly lighted.

In some instances it is doubtless due to carelessness, or ignorance, but in other cases there is a definite purpose to excape identification.

Would it be possible for you to caution the members of your association who are delinquent in this respect to obey the law, as we prefer to prevent rather than to have the law violated and then to prosecute in the police court.

Any assistance which you can render me would be appreciated.

Yours truly,
FREDERIC M. MITCHELL,
Chief of Police.

The Commonwealth of Massachusetts Massachusetts Highway Commission, Room 212, State House, Boston Oct. 30, 1917

Mr. Francis Hurtubis, Jr., General Counsel, N. A. A.

Our board is trying to register and get out of the way every auto possible during November and early December in order to reduce the great pressure in late December and early January. Many thousands of blanks have been mailed to owners of autos asking them to register same as early as they can, but, as you know, it would be an impossibility for us to send a special letter to everybody. Thought possibly you might be willing to make a short notice and see that it was published in the periodical in which you are interested so that every owner may get some form of communication, either through your periodical or by mail.

through your periodical or by mail. We have the number plates in storage and we would like to register 25,000 cars in November, if possible, and if so, we will give much better service to every one who owns an auto and registers same.

Any publicity you can give this will be beneficial not only to our board, but to the autolat as well.

Very respectfully yours, JAMES W. SYNAN, Com.

CONNECTICUT LICENSES.

Applicants for licenses to operate motor vehicles in Connecticut may in the future be required to pass a "skidding" test.

Commissioner Stoeckel of the State Motor Vehicle Department savs that a large percentage of serious accidents are due to skidding and investigation has shown that skidding results from failure to use chains and also from lack of proper driving knowledge. He adds that in ordinary driving apparently little use of the hand brake is made, so that in an emergency a driver does not revert to it.

National Highways—Good Roads Everywhere

Association Head Shows How They Will Do More Than Any One Thing for the Real Development and Defense of Our Country

By CHARLES H. DAVIS.*

How can the United States—48 of them—get good roads everywhere? One hundred million people want them. They have needed them 100 years or more. They have wanted them 50 years or more. Why have we grown into one of the great nations of the world, to be the only great nation without good roads everywhere? How did our more active and prosperous countries first get their good roads, such as they were? How did the few states that as yet have only made but a beginning get theirs? The answers will show us the way if we have the honesty and the truth to follow.

One thing is sure. No such platitudinous resolutions as were adopted by the Chamber of Commerce of the United States at Atlantic City, Sept. 24, 1917, will help much. They advocate no plan. They have no real force or purpose. In fact, there is but one plan that will attain our great objective-good roads everywhere-only one way-the way advocated by the National Highways Association and its founders. The only definite, concrete plan advanced from any source-the plan advocated from the beginning in the educational program of the association—is the plan expressed in the name of the association-national highways. This is the plan followed in other countries where they have attained good roads everywhere, and is likewise the method whereby a few good state highways have been attained by a very few of our 48 states.

Values for Military Uses.

Our nation is spending billions of our money in war preparation. Much that is going into emergency efforts will be thrown away. Very much less than our people are yet aware of is going into sound, lasting, permanent preparedness. A great military authority of national repute and patriotism has said:

"We could probably obtain adequate national defenses in 10 or 15 years, provided we seriously undertook and conscientiously carried through the work."

The same authority recently wrote the author the following (to quote and paraphrase):

"National highways will do more than any other one thing for real development and defense of our country."

And yet we have voted billions upon billions of money, of which practically nothing is for military or industrial roads. Such a policy—or lack of policy

*An address by Charles Henry Davis, C. E., president relational Highways Association, offers, to those assembled at the meeting of the Southern Commercial Congress. Hotel Actor, New York City, Oct. 15, 16 and 17, 1917.

—does not make for the confidence of our people. We are all for preparedness —real preparedness—for the defense of our dear country.

It is stated that 50,000 or more loaded cars are in transit that cannot be handled at our eastern, western and southern seaports. Loaded freight cars are standing on hundreds of miles of sidings within 200 or 300 miles of these terminals. These cars cannot be moved. Flour, grain, lumber, iron and steel are stopped in transit. Lack of cars and locomotives, inadequate harbor facilities, docks, lighters, vessels, terminals and tracks are all partly held responsible for the trouble. Shipments of freight, and even express, over distances of less than 100 miles, take weeks for their delivery.

This being true in time of peace within our home territory, although at war upon foreign soil, is it not obvious that in time of war within our own borders we would find ourselves absolutely without the needed transportation facilities? Such transportation preparedness is the rock upon which battles are won or lost.

The French in 1870-71 were defeated largely for that reason. Troops held for days where they are not supposed to be, without support or supplies and food, become mobs, and mobs cannot fight.

Battles cannot be successfully fought unless the machinery for men, horse, artillery, equipment, ammunition, supplies and food is on time like clock work. There can be no waiting, no delays, and promptness in execution depends primarily upon transportation.

Roads Worse Than Railways.

And how well equipped do we find our country in highway transportation facilities? Worse, far worse, than our railroads. And yet our highways should supplement our railroads as well as perform their natural functions. As a matter of fact to all intents and purposes we have not even begun to get good highways for peaceful, industrial uses. One can only travel a few miles over a good road before coming to many, many miles of poor roads, and more of utterly vile ones for many months in the year. Hardly a mile of even our so called good roads could stand the constant intensive traffic of a military campaign. They have not been located or built with any thought of any such possible use. Most of them are not even wide enough for industrial uses, to say nothing of their construction.

We seem to go ahead with our eves shut and our minds closed to what Europe has accomplished in highway building. Germany, even today in the midst of a life-and-death struggle with overwhelming odds, is putting more effort into building military and industrial roads than into almost any other activity. Many of our so-called road officials are butchers, bakers or candlestick makers, quite incapable of doing what should be done even when told what was necessary.

Our system of roads could be made to help out our railroads both in times of peace and in times of war. There is, however, but one way to attain these results within any reasonable cost and time. Just as town or township roads were unable to properly serve the country, so country roads were found inadequate for state needs, and now we are seeing that state roads cannot serve the nation * *

Many people in the small northeastern section of our country are antagonistic to the national government engaging in This section comprises road building. the six New England states and New York, New Jersey and Pennsylvania. Comparatively few people in the South, Southwest, Mississippi Valley states, Northwest, Rocky Mountain regions and the Pacific states, comprising the rest of the country, appreciate or understand this antagonistic point of view. This objection is not confined to a particular plan, but to any participation in such an undertaking by the national government. Of course all easterners are not opposed. The big, broad-minded, farseeing men of vision know to the contrary. Also many people do not know the vital difference between so-called "Federal aid" and national highways. The former means gifts of moneys to the states to help build roads. Various plans for this are suggested, but they are all fundamentally unsound because of the "aid" or "gift" feature contained in all. This method relieves the Federal government of all responsibility and will inevitably result in "pork" and not in roads. National highways, on the other hand, limit the mileage and fix the responsibility where the people can see and judge of the honesty and efficiency of their public servants, and thus assures the money getting into roads.

If there is one section of the country more than another where the good roads movement has not gained a foremost place in the minds of people, it is the northeast corner, comprising New England and the Middle Atlantic states:

Maine Rho
New Hampshire Con
Vermont New
Massachusetts New
Pennsylvania

Rhode Island Connecticut New York New Jersey

There are many reasons for this, the most important being the following:

New England Roads Improved.

The states above named are, as a group, the oldest and wealthiest in the Union. Their population is comparatively dense. Large and wealthy cities abound. Their roads, while not by any means approaching what they should be, are in general superior to those of the remainder of the country. Much more money has been available for their improvement than for those located in the newer, more sparsely settled, and, therefore, poorer states.

The percentage of improved roads in this northeastern corner is 14.47%. the remainder of the country only 7.83% are improved, or relatively about half as great. This northeastern corner has 12,2% of the total mileage of all public roads, while the rest of the Union has 87.8%. On the other hand the East has little to be proud of. This seeming superiority is really not as great as should be expected. The population is 28% of the whole; the wealth, 30.4%; the area, only 5.4%. Surely the East has little to be proud of with such greater advantages. This is more clearly brought out by the following table:

	COMPARATIVE	E A DEDEN	
Item	Whole U. S.	Northeastern Corner	Per Cent.
Population	91.972,266	25,868,573	28.0
Wealth	107,104,211,917	\$38,301,588,571	35.8
Improved roads (miles)	190,476	38,868	20.2
Land area (square miles).	2,978,890	161,976	6.4
Public roads (total miles)	2,199,646	268,534	12.2
Nat. highways (proposed)	50,485	5.143	10.1

Thus, it is shown that the central, western and southern states have made greater progress in road construction in relation to their wealth, population and area, and, therefore, ability, than the eastern states.

Analysis of Opposition.

But possibly the greatest factor which causes some eastern people to be relatively phlegmatic in regard to good roads, or possibly even antagonistic to them, is that this movement has now come to direct its attention very largely upon the national government participating in road construction. The reason is not hard to find. Among all the various plans which from time to time have been advanced, either for "Federal aid" to the states or for national highways, there are none which, upon casual inspection, appear to give the eastern states a fair share of the money or roads as the case may be. With most of the plans this criticism is quite just. On the other hand a system of national highways can be so designed and its financing so arranged that no such criticism will be justified.

When an easterner looks at a map of the United States upon which are drawn a number of lines, all of equal weight. representing a system of national highways, he is quite likely to say to hun-"the sparsely settled western self states get most of the roads, whereas we of the thickly settled East will have to pay for them." Most likely he will not stop to think that the roads would not all be constructed of the same mate-

rials and be of the same width and thickness, thereby costing the same amount per mile to build * *

One could cite examples without number, all proving the great truth that whatever benefits one portion of a nation benefits the whole nation. This must be admitted by all except those afflicted with an abnormal amount of sectional pride or greed. And in view of this fact it is believed that no one can offer any sound objection to the building of a comprehensive system of national highways-highways built, owned, maintained and controlled by the people of the whole nation as a unit, and, likewise, for the use and benefit of all the people, East, West, North and South.

The 39 states of the Union outside of this small northeastern section have 78 votes in the United States Senate to 18 representing the nine northeastern states. Some of these 18 are big enough and broad enough to know the untold value of such a system of national highways. These 39 states also have 312 votes in the House of Representatives, while the nine northeastern states have only 123 votes, some of which also know and understand the economic, financial, social and moral value of the national

highways as the only vehicle by which the nation can attain good roads everywhere.

Police Activities

Revere Beach Boulevard-The police are making arrests of violators of the speed laws on the Revere Beach Boule-vard. The speed limit there is an arbi-

trary 20 mile limit.

Brookline—Owing to several serious motor vehicle accidents in this town the authorities have ordered the police to en-force the motor vehicle laws and traffic regulations. Motorists will be required to keep within a speed of 20 miles an hour and slow down and signal at intersecting WAVE

RHODE ISLAND.

Providence—The police commissioners of this city are arranging a new traffic squad to devote its attention exclusively overspeeding motorists. So that mo-"have a care" in driving ity. The speed limit is an torists better "ha arbitrary one, and to the District Court, before which these cases are brought, practically all violators look alike. The fine is seldom, if ever, less than \$15, plus conts.

Providence, R. I .- Do not leave motor vehicles unattended for more than five minutes in the business section of the

city, nor more than 15 in other sections.

Tiverton, R I.—The police are arresting traveling faster than 15 the thickly settled portions of this

TRAPS.

Halifax—Between Whitman and the en-trance into Halifax it is open country; persons running over 25 miles an hour are being arrested

MARRACERESENTAL

Pittsfield. Mass - The motorcycle police of this city are still active, especially along the Pittsfield-North Adams state

Worcester, Camp Devens—Owing to several accidents and considerable care-less driving of motor vehicles, the military authorities have placed a speed limit within the cantonment of 15 miles an hour, and this rule, as well as the traffic rules, which will be conspicuously posted, will be atrictly enforced.

UNITED STATES HIGHWAYS.

An item of interest to New England motorists especially is gleaned from the recent report made by the office of Public Roads and Rural Engineering at Washington. It appears that at the close of 1916 there were 2,455,761 miles of gural roads in the country, of which 287,047 miles were surfaced in some way. In other words, only 111/2 per cent. of the roads were other than dirt, which emphasizes the fact that the great road problem in the country for a number of years to come will be to secure the most economical and efficient improvement of dirt roads.

It also appears that of all the states Massachusetts has the greatest percentage of her roads surfaced, namely, 47.6 per cent. Indiana comes next with 42.5 per cent.; New Jersey with 40.5 per cent.; Ohio with 36.5 per cent.; Rhode Island with 34.5 per cent.; Kentucky with 23.2 per cent.; New York with 22.7 per cent.; Connecticut with 22 per cent., and California with 20.2 per cent.

And that almost \$273,000,000 was spent on the roads of the country during the year 1916.

RHODE ISLAND HIGHWAYS.

The great main highway between Providence and Narragansett Pler. known as the Narragansett Pier road, is undergoing material changes in the alignment and grades of the road and the elimination of two dangerous curves and a steep up grade over Barbour's Heights hill in the town of South Kingstown. Leaving the present highway near the Green farm, just below the village of Hamilton, the route extends in an almost straight line through the meadows and across a marsh to the foot of Borbour's Heights hill, where it rejoins the old highway. Instead of the short, abrupt grade, which since the state road was first built, has tested the hill climbing ability of motor vehicles, it is planned to have a gradual rise from a point close to the junction of the new layout and the old road at the Green farm, the filling in along the new route and the cutting away of the brow of Barbour's Heights hill. The section of the new way now under improvement is about one and a half miles in length and includes in addition to the new lavout through the Green pasture land a considerable part of the old road on Barbour's Heights.

CONNECTICUT CASUALTIES.

The public authorities of Connecticut report fewer deaths from automobile accidents during the lade five months of the fiscal year of 1917 than for the corresponding period in 1916. Nineta-five persons were killed in motor vehicles.



Driving Used Car Illusions

Around a Circle

NETY PER CENT. of the automobile owners who ought to be in the market for a new car drive their old car around until it is shabby and almost ready to fall apart. Most of them have been told that the depreciation on their machine was 50 per cent. the first year, 30 more per cent. the second year, the third year it is worth nothing and after that the car owes the junk dealer money every puff of breath it takes.

So they ride around in the old car another 1000 miles or so and put off the day when they should go around and buy the new car they are able to buy, entitled to have and are being buncoed out of by the operations of a peculiar superstition prevalent among car owners that what they have is good enough rather than to give the old machine away for a song.

They have been told so earnestly and

so frequently that used cars are a glut on the market that they swallow the bait, hook, line and sinker, and do not even take the trouble to find out whether such assertions are really and truly so, or if they are simply the inventions of persons who put out this line of information without full knowledge, or with some special purposes to serve, and to whom the matter of knowledge or no knowledge on the subject is a matter of very great unimportance.

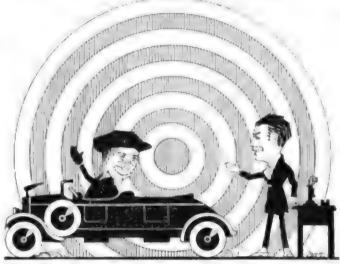
They may have been told further, that it is useless to try and get a fair value for the old car and that the best way to get their full value out of the vehicle is to ride it out. So they ride around another thousand miles or so and think

they are lucky that the government, or some other high and mighty authority, don't come and take it away from them.

They may have been told that they better not go near Mr. Dealer's because he is pushing a certain new car very assiduously and will offer a trade if one doesn't watch out. They are told in this connection that there are certain cars on the market today that are made to sell to people who want a lot of money for their "old car;" that they can give a long trading price, but they certainly can't give much of a car in boot. And, strange as it may seem, there are a good many automobile owners agaid of a shadow like that. So they ride around in the old car another 1000 miles or so and they wonder why Mrs. Smith-Rox neglected to bow to them at church of a Sunday

morning. One illusion breeds another and the whole crop keeps motorists driving around in a circle, sometimes fast and sometimes slow, but always with small hope of either getting off at a tangent or making a short cut to the centre.

They have been told that somebody. association, individual or publication has a price chalked against their car according to the date on which it was turned out of the factory; that it is a price that wouldn't buy an old cheese on a rainy market day, and yet to all practical intents and purposes it might as well be chalked in figures a foot high on the side of the car body, for the people who have to do with these things believe that it is just about the proper ticket and because it is low enough that they need not take the trouble to appraise the machine for themselves and determine its exact mechanical worth and service possibilities.



First Class Marksmanship in the Used Car Department Sends the New Car Gliding Across the Target.

Too many car owners have many illusions about this question. They have been told that in order to buy a new car they will have to brush up on their salesmanship. So they ride out another 1000 miles or so of the remaining service value in the car and clip another coupon from the \$500 bond that should have been in the hands of the dealer long ago, or its equivalent, and well on its way to the manufacturer. The illusion still holds the motorist that he has spent a good many hundreds of dollars on the car, kept it remarkably free from squeaks and rattles and has a machine that gives him the service he wants every time he calls on it for duty. He rides past the dealer's door a dozen times before he gets a glimpse of the new sign that has been hung out by the new service man. When



he does see it the words are just a blur and he has the illusion that it means nothing very different from the old one which he has the illusion that it read:

USED CARS KEEP OUT OF HERE.

So he rides around another 1000 miles or so under the impression that he is getting more service value out of his property than a set price schedule will admit is in any car of that make and model. About this time he is in the grip of a genuine illusion. For the new service man is wide awake to the fact that set prices are an illusion, that it is not possible to set a valuation on a used car by any rule of thumb ever made, and so his new sign reads:

BRING YOUR CAR IN; LET'S TALK IT OVER; EXPERT APPRAISEMENTS.

With light streaming in on the used car business to the effect that it is a real business and must be so conducted for the best interests of the owner, dealer and manufacturer. the days of driving around in a circle are numbered. The owner knows the worth of his car on the basis of mechanical condition and its remaining service value, the staple values of his property, and will so pass it on in the market where its appearance and service after overhaul maintains the car as a purchaseable commodity.

There is one thing about a circle. The distance from circumference to centre is very short and the bull's eye of used car target is the square deal.

The rising tide of interest in what a car is worth after it has

traveled several thousand miles, as well as the effect on production of war operations, is a progressive sign in motordom. It says that the traveling worth of a car is more important than the year of its design. After all the car's the thing.

SAXON COMPANY SELLS NOTES.

Through the sale of an issue of \$600,000 of 10-year six per cent. notes, the Saxon Motor Co. has been able to resume work on its plant in Detroit. The work was stopped several months ago when the company experienced financial difficulties. On Nov. 1 the company will pay a 10 per cent. installment on its debt to creditors; another of 10 per cent. on Feb. 1 and the remaining 80 per cent. by Aug. 1, 1918.

PLATE XII.

NEAT STUCCO GARAGE FOR ONE MOTOR CAR

Many Conveniences Planned in Compact Hip-Roof Structure, Framed to Correspond in Finish With the Other Buildings

Designed by the Architectural Department of the Automobile Journal Publishing Co.

N THE average private estate the owner's garage requirements call simply for a substantial building in which to house his motor car, although it must be of permanent type of construction and finished so that it will harmonize with the dwelling and not fail to harmonize

with the place.

The stucco garage is admirable for such a location, being rugged and sightly in appearance and susceptible to almost any kind of finish that the owner chooses to make it match surrounding buildings. Such a building is shown in the plans in this issue and it is designed for housing one machine on a private estate. The principal feature is the stucco walls laid on metal lathes on which there are a number of kinds, some very rigid, making the structure stronger and more durable. The stucco is placed over the lathes in three coats. The first coat should be made of one part cement, three parts clean, well graded sand, 10 per cent. of the weight of the cement of hydrated lime and one-half pound of hair per 100 pounds of cement. Before this coat has set it should be scratched with some sharp instrument so that the second coat will adhere readily. The second coat should be applied before the first coat becomes dry and should be mixed the same as the first coat, except that only 21/2 parts of sand are used and no hair. Special care should be taken in laying this coat, as it forms the shape of the surface, the last coat being a finishing coat and one that is mixed with pigment if desired to match the color of the residence.

If it is desired to make the surface of the stucco correspond to that of the house, it can be brought out by treating the third coat before it sets. This surface finish may be made in several designs, by roughing it or giving it a splatter dash or pebble dash appearance. The stucco is also used to cover the underpinning.

The concrete walls, which extend below level 31/2 feet, are made of a mixture of concrete consisting of one part cement, two parts sand and five parts crushed or coarse stone. Before the cement hardens it is a good plan to place in position the bolts that are to be used in fastening the sills.

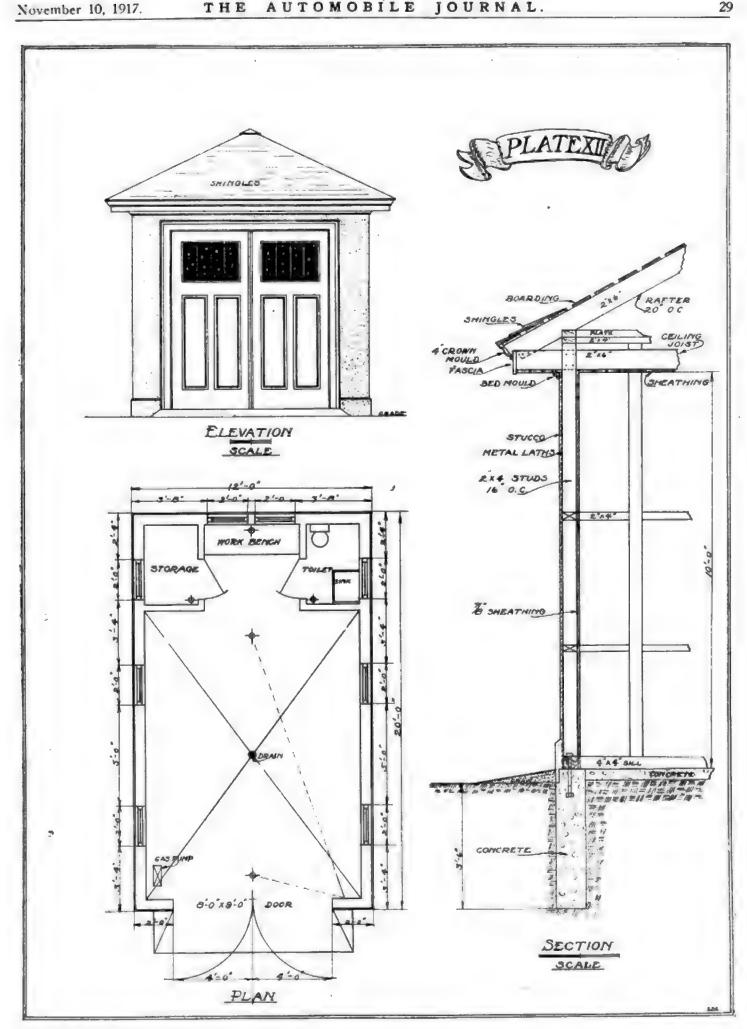
Drain and other outside connections should be provided for when the trenches for the founda-

tion are dug and it is also convenient to lay the floor at the same time as the foundation, as in this way all the concrete mixing can be done at the same time, greatly facilitating the work and economizing on labor. Two mixtures are used in the floor, the first layer, three inches thick of one part cement, two parts sand and five parts of crushed stone, and the surfacing layer, one inch thick of one part cement and two parts sand. The floor should have a slight pitch toward the centre to carry the water to the drain.

As shown in plan the building is framed on 4x4-inch sills with 2x4-inch studs; 2x6-inch spruce rafters and ceiling joists and the plates are made by nailing two 2x4-inch studs together. The inside is sheathed with North Carolina pine sheathing seven-eighths of an inch thick. The cornice should be made of white pine stock, including crown mold, facia, plancier and bed mold. The roof is of the "Hip" type, made of hemlock boards laid two inches apart and nailed to the rafters. Extra cedar shingles laid 41/2 inches to the weather and nailed with galvanized nails. White pine stock is used for the saddle boards.

The doorway is eight feet wide, affording ample entrance room, and is closed with two swinging doors with windows in the upper halves to increase the light. A mullion window is located directly over the work bench and there are six other windows, located as shown, which can be either hung or hinged as desired. In addition to the toilet at the rear there is a small room for storing the various things that are needed in a garage, and it serves to keep the equipment in order and keep the interior neat and trim,

Much waste and dirt accumulates in a garage, particularly old casings, tubes and other things of sufficient value to be retained, and if a closet is provided for such articles, such as the one marked storage in this design, the interior of the building proper can be kept presentable. The cost of a garage of this type would be dependent to a considerable extent upon the ruling wages for labor and the accessibility of materials, but even if it were constructed of the very best of material and hardware the total outlay should not exceed \$800.

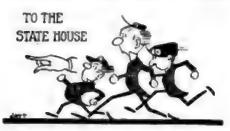








Massachusetts motorists stampeded for the State Capitol in Boston when they heard of the order promulgated by the Highway Commission to the effect that there will be no "days of grace" after the first of the year in which they can drive their cars unmolested with the



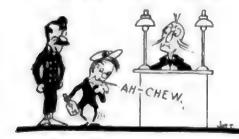
1917 numbers attached, but must have 1918 plates or be liable to arrest. The commission has the new plates on hand and believes it has given ample notice so that motorists can comply with the law.

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Down in New Jersey it will soon become commonplace to inquire if the grocery store has arrived. As paradoxically as such an inquiry might seem, it will be a perfectly proper one as soon as the new corporation organized there gets its fleet of grocery stores in operation. These stores will be mounted on gasoline propelled vehicles and will carry a full line of groceries and other things that are found on the shelves of the corner grocery. They will be driven through the suburbs, taking orders and delivering them immediately.

The world's rubber production for this year is placed by conservative authorities at 250,000 tons, which is about double the production at the beginning of the war. About 60 per cent. of this is used in the United States.

Automobilists when apprehended for



driving while intoxicated contrive many novel excuses for their condition, to minimize if possible the penalty that is invariably meted out to them. A judge in one of the Massachusetts courts recently listened to a good one, but apparently

had little faith in the prisoner's veracity, as he imposed a fine of \$75 and costs, after the defendant explained between coughs that he took the gin, which was responsible for his condition, as a cure for asthma.

This is certainly getting to be a "motor age," as the Western Canadian Motorist observes, when Indian berry pickers, who formerly considered themselves lucky to be able to own a cow pony, now ride to their work in automobiles. In the Kamloops district a number of natives own motor cars.

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The food conservation movement has been productive of much good to both growers and consumers, as since its inception thousands of motorists have gone into the country and purchased their vegetables and fruits direct from the producers and brought them home, saving the middleman's profits, and at the same time getting fresh produce. Many motorcyclists having side cars on their machines also availed themselves



of the opportunity, and it was a common sight on many roads in the early fall to see one speeding along the road, homeward bound with a supply of produce for canning.

Under the new conditions brought on the motor industry by the war one can no longer maintain his social prestige or position by sporting a new car each year with all the latest fixings. There will not be enough cars to go around by January, prices will be higher and many motorists will be glad of the opportunity to use their old buses without shame. regardless of their appearance. The repair and paint shops should experience a rush of business this winter and spring grooming up old cars for those who, insist that their vehicle always look as spic and span as it did the day they bought it. -:::-

With women rapidly forging their way to the front in politics and business, there is no good reason why they should not make good saleswomen, as they are gifted with the conversational art and handle it in a convincing manner, as any husband will testify. They are also very enthusiastic about anything they take up, and for this reason one Boston distributor placed a young lady on his sales staff and she proved successful from the

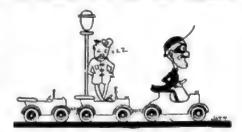


start. No better proof of qualifications for the position is found than her own description of her experience. She says: "There is more pleasure in driving a motor car than in doing anything else. It's not only wonderful sport, but it is the healthiest recreation for any woman. I always believed that I could sell motor cars and after making a trip in a touring car from Syracuse to Boston, a distance of 370 miles, in less than 17 hours, I raved so much about the car that I could not resist the 'something' which makes a person want to go and sell."

Tammany won the sweepstakes in New York's mayoralty election hands down, so the little old metropolis ought to be some burg for the rest of the war, or after the war, as the case may be.

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Down in New York the theft of automobiles is becoming so common the officials fear that it will soon be looked upon by many the same as the umbrella borrowing habit, and that men who find their own machines have been taken will jump into the nearest one handy and drive it off. In the first nine months of the present year over 2000 machines



were stolen in New York and the police commission seriously proposed that a law should be enacted providing for the arrest of persons who were so careless as to have their machines stolen. This is probably the only remedy, as the cops seem powerless now to catch the thieves.

Jordan Forecasts Car Shortage

Edward S. Jordan, president of the Jordan Motor Car Co. of Cleveland, O., in making his annual report to stockholders gave some interesting facts bearing on the outlook in the motor car industry.

"There has been no over-production of good cars this year, and at present there is a big shortage of enclosed cars.

"The masses will be very prosperous Ford could easily sell a milthis year. lion cars. The saturation point in motor cars will be reached when everybody has one, and when no car ever wears out.

"Once a man has accustomed himself to carrying on his business with the aid of the telephone and the motor car, he can as well afford to be without one as without the other. Just as long as there is a woman, wearled by family cares, who has come to know the convenience of a motor car, there is a potential prospect waiting.

"There are approximately 1,000,000 possible purchasers of Fords: 300,000 possible purchasers of cars below \$1000, excepting Fords, and possibly 50,000 between \$1500 and \$2500. Under the influence of increased list prices and taxation the number of cars in certain price fields may be reduced, but the aggregate sales seem to be increasing.

"There were 191,724 more cars and trucks sold during the first six months of this year than in the same period last year, and shipments of all cars in the last quarter exceeded by 2000 car loads the shipments of the corresponding month one year ago."

The Jordan company placed its first cars in the market in September, 1916, and during its first fiscal year sold 1788 cars at a valuation of \$3,189,600 on a working capital of \$300,000. The company is adhering to the policy of building only 2000 cars annually.

SILCO GREASE.

The fundamental principle of efficient lubrication is the practical application of a lubricant scientifically compounded. In a transmission or differential, not only must the fundamental principle be adhered to, but the lubricant must possess a certain quality of body so that it will both lubricate and cling to the gear teeth at the point of pressure.

It is said that Silco transmission and differential grease has all the qualities necessary for this class of lubrication. It maintains its consistency under all conditions, and at different temperatures, This lubricant is made from a base of super refined steam oil, which is said to be the best gear lubricant base known.

In addition to the regular line of transmission and differential grease, the manufacturers produce a cup grease which they claim will not drip or run from the bearings, which is also made from super refined oil base; a compounded graphite

grease for lubricating brakes, circulating pumps, steering gears and wherever graphite grease is required; and a spring lubricant which is unaffected by water or temperature and guaranteed not to run from the springs.

The manufacturers, International Lubricants Co., have a factory at Medford. Mass., with branch offices at 75 State street, Boston, Mass., and at 51 East 42nd street, New York, N. Y. Dealers or users of lubricants of high quality are invited to write for particulars relative to the Silco line.

COMMONWEALTH FINANCE CORPORATION EXPANDS.

The Commonwealth Finance Corporation of New York City has leased add tional space in the 20th floor of the American Surety building, 100 Broadway, to care for the constantly growing

volume of its business. The company has also opened an office at 323-4 Bulletin building, Philadelphia, Pa., under the management of L. M. Seiver. It is the largest capitalized financial institution in the country specializing in automobile paper.

SEE THE TRADE OUTLET.

Davis the Hardware Man, at the corner of Portland and Sudbury streets. Boston, Mass., is making an extremely attractive offer, which should prove of interest to the motorist at this time of the year, because of the possibilities of winter driving.

Davis is selling a limited number of the well known Type E 20 Gray & Davis Spot Lights for only \$1.98, and though the offer holds good only until Nov. 25, doubtless many of our readers will be glad to take advantage of this opportunity to increase the car equipment at a minimum cost. In addition to this bargain Davis is making a special proposition to dealers.



SHOWS.

Denver, Col., automobile and accessories show
Akron, O., automobile showDec. 3-8
New York, automobile salon, Hotel As-
torJan. 2-9
New York, 18th annual automobile
showJan. 5-12
Washington, D. C., carnival and open
house weekJan. 11-18
Providence, R. I., automobile show
Jan. 11-19
Philadelphia, 17th annual automobile
showJan. 11-19
Milwaukee, Wis., automobile show
Jan. 18 24
Montreal, Can., automobile show
Jan, 19-26
Cleveland, O., 17th annual automobile
showJan. 19-27
Scranton, Pa, automobile show Jan. 21-26
York, Pa., automobile showJan. 21-26
Portland, Ore., automobile show
Jan. 21-26
Mifflintown, Pa., automobile show
Jan. 22-26
Allentown, Pa., automobile show
Jan. 23-28
Chicago, III., national automobile show
Jan. 26-Fob. 2
Chicago, III., salon, Congress hotel
Jan. 26-Feb. 2
Harrisburg, Pa., automobile show
Jan. 26-Feb. 2
Manchester, N. H., academy Jan. 28-Feb. 2
Minneapolis, Minn., automobile show
Kansas City, Mo., automobile show
ransas City, Mc., automobile snow

Kansas City, Mo., third annual tractor
show
St. Louis, Mo., automobile show Feb. 11-16
Newark, N. J., automobile show
San Francisco, second annual automo-
bile show
Waterbury, Conn., automobile show
Feb. 18-23
Des Moines, la., automobile show
Feb. 18-23
Syracuse, N. Y., automobile show
Feb. 18-23
Grand Rapids, Mich., automobile show
Feb. 18-23
Springfield, O., automobile show
Feb. 18-23
Pittsfield, Mass., automobile show
Ficting was automobile agow Feb. 18-28
South Bethlehem, Pa., car and truck
showFeb. 18-23
Brooklyn, N. Y., motor vehicle show
Feb. 22-March
Omaha, Neb., automobile show
Feb. 23-March
Boston, Mass., Boston Automobile Deal-
ers' Association showMarch 2-5
Trenton, N. J., automobile show
March 20-2
Stockton, Cal., automobile show
Stockton, Cat., automobile show
MESTINGS
MEETINGS.

New	York,	Automobil	le Electri	ical As	30-
cia	tion			Jan.	3-4
New	York,	Society o	f Autom	otive E	≧n-
gir	neers,	annual		Jan.	9-10
New	York,	National	Associati	on of J	10-
ce	SSOTY	Jobbers		.Jan.	11-16





PERMANENT ATLANTIC CITY SHOW

Famous Garden Pier Announces Automobile Exhibit as Constant Attraction, Begining Christmas Holidays

THE famous Garden Pier at Atlantic City, in addition to its many other points or attraction, will stage a permanent automobile show, where many of the latest creations of the leading automobile manufacturers of the country may be inspected by the throngs that pass daily along the great boardwalk.

Each exhibitor will have sufficient space to display three models, which can be placed in charge of either the impartial attendants and experienced salesmen which are furnished by the management, or a representative of the factory.

A huge electric sign, 144 feet long and 40 feet depth on top of the exhibition hall will be used to flash individual advertisements at night and the Pier company is planning the publication of a magazine for free distribution and each exhibitor will be entitled to two pages of advertising free. Movie screen advertising will also be used to advertise the cars on exhibition, and any commercial picture or film the exhibitor chooses to furnish will be shown.

An annual entrance fee of \$1500 which entitles the exhibitor to his space for 365 days, covers practically all of the costs. It is proposed to start the show during the Christmas holidays and to continue it permanently thereafter.

HEARNE WINS AUTUMN CLASSIC AT UNIONTOWN.

The Autumn Classic at Uniontown, Pa., held on Oct. 29, and the last important race on the speedway schedule for 1917, was won by Eddie Hearne. The distance was 168 miles and his time was 1:49:2.85. Tom Milton came home second in 1:49:27.45, and Earl Devore, finishing out Ira Vail's hand, came in third in 1:54:37.05.

The 50-mile consolation race was won by Fred McCarthy of Pittsburgh and also the three-cornered match race for the Uniontown speedway championship trophy.

MCNEAR AGAIN HEADS THE BAY STATE A. A.

At the annual meeting of the Bay State Automobile Association, George W. McNear was re-elected president. other officers were chosen as follows: Vice president, A. E. Lerche: secretary, James Fortescue; directors, Dr. A. R. Crandell, W. H. Reed, W. M. Stevenson, A. P. Teele, John E. Kellev, Robert Shirley, John P. Coghlin, Edward Becker and Charles H. Pepper.

Secretary Fortescue, in his annual report, announced that the officers of the organization had been active during the year in opposing objectionable legislation, and that a number of clubs were

being formed in various parts of the state that would become affiliated with the association.

RECEIVER FOR ROSS CAR.

The court has appointed B. F. Everitt as permanent receiver for the Ross Automobile Co. An inventory is being taken of the company's property and it is believed that the creditors will get 100 cents on the dollar if the business and factory is sold.

DREXEL ASSETS SOLD.

The property of the Drexel Motor Corporation, Chicago, has been sold at auction. The assets were valued at \$122,410. capitalized company was \$2,000,000 and started business in July, 1916, to succeed the Farmack Motor Car Corporation.

Stockholders Win a Division of Ford **Profits**

Decree Will Affect \$30,000,000 of Surplus Funds if the Decree Survives Appeal.

A decision in favor of the Dodge Brothers has been handed down by Judge George S. Hosmer in their suit against the Ford Motor Co., asking that the defendant divide 75 per cent, of the \$59,000,000 profits of the fiscal year ending July 31, 1916. In the decree the judge ordered the division of but 50 per cent. of the profits, stating that "the acquiescence of a stockholder in the past will probably stop him from demanding full relief in the case at bar." Ford's attorneys have filed notice of an appeal from the decision, but in case it is sustained about \$30,000,000 of the Ford surplus will have to be divided among the stockholders.

RUBBER NOW BROUGHT THROUGH PACIFIC PORTS.

Before the war American rubber manufacturers were able to get crude rubber only through London, for England has always demanded that all rubber from the far eastern rubber plantations. which she controls, should be distributed from that city. But since the closing of the Suez Canal to merchant trade, as far as American shipping is concerned, all rubber destined for America has come across the Pacific ocean to our western ports. The importance of this trade to these ports is shown in the \$5,000,000 worth of crude rubber business handled at Seattle, Wash., during the month of August.

Recently the largest shipment of crude rubber ever consigned to an American firm came across the Pacific from Singapore to Seattle, in the steamer Luise Neilsen, for the Goodvear Tire and Rub ber Co., Akron, O. This shipment consisted of 25,000 cases of plantation rubber, weighing 1875 tons, valued at nearly \$3,000,000.

"DUPLEX DOINGS" GIVES HEAVY HAULAGE FACTS.

"Duplex Doings," the heavy haulage magazine, published by the Duplex Truck Co., Lansing, Mich., is the new organ through which the makers of Duplex trucks are keeping truck owners informed of the solution of heavy haulage problems.

The October number has a picture and description of the work performed by a Duplex in pulling a load of 13,000 pounds through the muddy oil fields of Wyoming, and also a story of another Duplex pulling a warehouse loaded with its usual stores a distance of four blocks. The weight of the building was estimated at 80 tons and the truck during the haul was loaded with three tons of cement blocks to give it traction.

Contractors and others interested in heavy truck work may receive the magazine from the Duplex Truck Co.

N. Y. AUTHORITIES PROPOSE DRASTIC ANTI-THEFT MEASURE.

Commissioner of Police Arthur Woods of New York City practically admits the impotency of the police force in the metropolis in face of the rapidly increasing number of car thefts. Upon receiving a report that from Jan. 1 to Oct. 15, 1725 automobiles were stolen in New York City, an increase of 40 per cent. over the same period in 1916, he asked Corporation Counsel Lamar Hardy to draft a law compelling motor car drivers to lock their machines when leaving them unattended in public streets.

With such a law in force the commissioner says the members of the police department will be instructed to take cars that are not attended or properly locked to the nearest station house, and when the operator claims the car he will be served with a summons to appear in court for leaving his car unattended. Such a law of course would be tantamount to arresting every man practically who suffered the misfortune of having his car stolen, as the moment he re ported it and admitted that it was not locked the authorities would arrest him.

Out of the total of 1725 machines stolen, 1466 were recovered, leaving 279 unaccounted for.

FORD CARS IN SEPTEMBER.

The Ford Motor Co. of Detroit made 62,365 cars in September, of which 60,982 were passenger cars and 1382 trucks.



NOTICE TO READERS.

This department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactority, or if you desire information regarding operating, maintaining or repairing motor cars. do not heatiste to lay your troubles before him. He will snawer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should always be signed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

HOW DO YOU MANIPULATE THE SPARK ADVANCE LEVER ON YOUR AUTOMOBILE FOR POWER AND EF-FICIENCY?

To the writer of the best answer to the above question \$2.50 will be paid. For the next best answer \$1 will be paid. The best answers received will be published in the second issue after the appearance of the question in the magazine. Answers to the question should be in the hands of the editors by the 5th of December. The contest isopen to every one.

LOCATING KNOCKS.

(F. A. Byerly, Buffalo, N. Y.) Best Letter.

As a knock detector for locating noises in the engine or transmission of my car, I use a hard wood stick, about ½ an inch in diameter, nailed into the bottom of a common metallic salt shaker, from which the cover has been removed.

By placing the stick against the various parts and my ear against the salt shaker I can easily locate any knock, for the vibration of the stick is carried and magnified by the salt shaker box.

First I jack up the rear wheel. I always exercise extreme care in this and block the rear up firmly so that no amount of jar or vibration will shake the wheel on to the floor. Then I start the engine and listen for knocks with my detector. After I have gone all over the engine and transmission I engage the emergency brake just enough to put a slight drag on the engine and make conditions similar to those encountered on the road, then listen again.

After the engine has been tested out I try all of the speeds, one at a time, and listen for knocks in the transmission.

Mr. Byerly's idea of using a salt shaker and stick for locating knocks is a good one. There are a number of devices now on the market which are designed along the same lines, namely, to centralize the vibration. The salt shaker stick combination, though simple, is effective. A little better looking apparatus may be made from an old telephone receiver and a stick. The handle of the receiver is hollowed out and the stick fastened by a screw or nail to the diaphragm. Much of the tinny sound present in the tin box is eliminated with this apparatus.

YOU SEE

the hottest, quickest, best timed spark you can get is none too good in view of the low grade fuel you are now forced to use.

BOSCH MAGNETOS

insure the proper output of an engine throughout its entire range, from lowest to highest speed, with the greatest efficiency at every point in this range.

Correspondence Invited

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New York

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DETROIT SA
Service Stations in Every State

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You should use it to save money.

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How Many Hide

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Wilmington Del.

(Works at Newburgh, N. Y. and Fairfield, Conn. madian Office and Factory, Toronto

World's Largest Makers of Leather Substitutes

(When Writing to Advertisers, Please Mention The Automobile Journal.)

gins to drop until it reaches zero and then builds up to its peak in the opposite direction. This happens if the circuit is established in the armature winding.

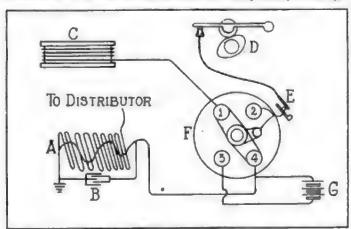
Referring to the accompanying diagram, C is the armature winding, one end of which is grounded to the frame, the other is connected with the centre terminal or so-called primary collecting brush.

Leading from this is a wire which connects it with the switch terminal No. 1. Switch terminal No. 2 and the switch bar are connected as shown with the starting button E, which is in turn connected with the ungrounded platinum contact in the breaker box.

With the switch on the magneto position as shown, current passes from the armature to the switch terminal L, across the bar to the centre. If the cam at D is down in the position shown the current then passes from the bar through E to the platinum points of the breaker points, through them to the ground and back to the armature.

When the platinum points in the breaker box are separated this circuit is broken, and the current instead of passing from the bar to E. passes from the bar, through terminal No. 4 to the primary winding of the coil, through it to the ground and back to the armature. As it passes through the coil it induces a current in the secondary winding, which is carried through the distributor to the spark plugs.

The point at which the platinum contacts in the breaker box separate is at the peak of production, so that the maximum amount of current passes through the spark coil. The condenser E is connected across the coil of primary windings



Splitdorf Ignition System Wiring Diagram. A, Spark Coll; B, Condenser; C, Magneto Armature; D, Breaker Box Mechan-Ism; E, Starting Button; F, Switch; G, Battery. Switch Is Set for Magneto Ignition.

to absorb the flow of excess current.

With the bar in the battery position the connection between terminals Nos. 1 and 4 is broken, and a connection is made between Nos. 2 and 3. The current then flows from the battery to terminal three, across the bar to E and thence across the platinum contacts of the breaker box, if they are together, to the ground. From the ground through the coil and back to the battery.

As this flow of current through the coil is interrupted by the snapping apart of the contacts at D, the secondary current is set up in the coil. The secondary current flow is set up only at the coil as the points separate. To fire a charge of gas in one of the cylinders the arrangement at E is designed so that the contact points may be separated, breaking the circuit and inducing a secondary current in the coil.

LOSS OF POWER IN CADILLAC 1912 CAR. (D. J. M., Greenwich, Conn.)

Will you kindly give me some information relative to a Cadillac 1912 car? My car does not seem to give any power on the hills though I have recently installed new leak proof piston rings, put on a Stromberg model M 2 carburetor, ground the valves, adjusted the valve and tappet clearance, removed the carbon and tested the intake system for leaks, but found none. The mileage averages about 8½ miles to a gallon. The valve bushings are worn pretty badly. Would

The AUTOMOBILE JOURNAL

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TIMES BUILDING PAWTUCKET, R. I.

HEINZE



The

Automobile Journal

Is the oldest Automobile magazine published in America devoted wholly to owners of pleasure cars.

A quality magazine, with prestige and circulation that brings results to advertisers.

TIMES BUILDING PAWTUCKET, R. I.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912, OF

THE AUTOMOBILE JOURNAL.

PUBLISHED SEMI-MONTHLY AT PAWTUCKET, R. I. For Oct. 1, 1917.

State of Rhode Island, County of Providence.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared William H. Black, who, having been duly sworn according to law, deposes and says that he is one of the owners of The Auto-mobile Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wite.

That the names and addresses of the publisher, editor, managing editor and business managers are

PUBLISHER, W. H. & D. O. Black, Jr....Pawtucket, R. I. EDITOR, E. H. CUSTER......Pawtucket, R. I. BUSINESS MANAGER, W. H. Black Pawtucket, R. I.

2. That the owners are:

W. H. BLACK......Pawtucket, R. I. D. O. BLACK, JR......Pawtucket, R. I.

3. That the known bondholders, mortgagees and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages or other securities are:

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

(Signed) WILLIAM H. BLACK, Co-Partner. Sworn to and subscribed before me this 20th day of Oct., 1917.

(Signed)

THOMAS BESWICK, Notary Public. (My commission expires June 30, 1920.)







ELDIN MOTOR CAR CORPORATION, 2007 St. Michigago, U. S. A.

this make a difference? The engine will not throttle down very well and knocks if forced up a hill.

Will you also tell me how to drain the oil from the crank case? The electrolyte in the storage battery tests to 1.200. Is this right? The starting motor does not turn the engine over fast enough to start it unless the engine has heated, and the lights do not burn brightly. What do you think the matter is with it?

How are the timing gears lubricated in this model Cadillac? Is the lubrication automatic or is it necessary for me to oil them?

Your trouble is probably due to the excess air admitted around the loosely fitting valve guides. It is very essential that the valve stems fit the guides, or air will be admitted around the intake valves, weakening the mixture to such an extent that its explosive power is greatly impaired. To nullify this to a certain extent more gasoline must be used, which probably accounts for the excess gasoline that you are now using. We would advise you to make a very careful examination of the intake line, as well as the valves, replacing the bushings or valves, so that a tight fit is assured.

There is evidently trouble in your battery system, for the electrolyte should have a specific gravity, under ordinary conditions of from 1.285 to 1.300. We would suggest that you have the battery charged at a regular charging station. If the electrolyte again shows a drop to 1.200 it is an indication that the generator is not charging at a high enough rate and should be inspected by a repair man experienced in this class of work.

A careful examination of the ignition unit should be made, the distributor cover should be taken off and cleaned with a soft cloth. The platinum points of the breaker and contact arms should be smooth and unpitted. This is vital, as the action of the current often wears off the surfaces to such an extent as to result in much loss of power. The distance between the platinum points should be adjusted to .010 of an inch when the contact arm rests in the space between the lobes of the cam.

You will probably find that the starting motor will run up to full speed if the storage battery is fully charged. If it does not, carefully examine all of the wiring, particularly at the battery terminals, where corrosion is very apt to increase the resistance.

No provision was made on the 1912 engine for draining the oil from the crank case, though it is an easy matter to siphon the oil out from the side plates.

The timing gears are lubricated by the oil from the engine, and beyond the ordinary upkeep of the regular oiling system no further attention will be necessary.

WATER VAPOR IN ENGINE.

(F. R. F., Brockton, Mass.)

Can you tell me why my automobile seems to give better results on a foggy evening or when it is raining, than on a pleasant day? At times I can cut the gasoline supply down about 25 per cent, and get more power.

It is a well known fact, and one that has been substantiated in the past year, that the introduction of water vapor results in more power and the elimination of carbon. Water is composed of two gases, hydrogen and oxygen, in such proportions that as a gaseous mixture they form a violent explosive, even stronger than gasoline and air. When the vapor is admitted to the engine and subjected to the intense heat of the explosion it is partially decomposed into its gaseous form, immediately forming an explosion which adds to the power of the original explosion of gasoline and air.

In addition to the explosive effect of the water vapor, the introduction of water tends to drive off carbon accumulations and thereby increase the efficiency of the engine.

For these two reasons an engine gives more power on a damp or foggy day, since the air supply is more or less mixed with water vapor.

WHITE CAR STEERING GEAR. (J. L., Richmond, Va.)

Will you kindly tell me how I can take up the lost motion in a White car steering gear?

The steering gear of a White car is of the worm and sector type and fitted with two adjustments. The first is designed for taking up the end thrust of the worm, mounted on the steering shaft. This adjustment is located on the lower end of the steering gear, next to the throttle and spark advance gears. Loosen the binder screw and turn the large nut clockwise until all up and down motion of the steering shaft is taken up. Be careful not to tighten the nut too much.

The second adjustment for bringing the sector closer or carrying it away from the worm is located on the side and consists of a so-called eccentric bushing, which carries the sector and ball arm. By turning the eccentric bushing the sector is moved nearer or farther away from the worm. The bushing is locked by a set screw located on the under side of the steering gear hub.

HUPMOBILE,

(Continued from Page 16.)

bracket. This bearing should be replaced, if it shows wear, since it will cause considerable noise, if there is any play in the shaft.

The fan belt pulley of model K machine is retained on the shaft by a nut located in the pulley. When this nut is removed the pulley may be pulled from the shaft with a wheel puller and the shaft may then be withdrawn from the front of the housing.

Points on Ramoving the Crankshaft.

After the chains have been removed and crankshaft bearings taken off, the crankshaft may be removed from the engine. The flywheel is fastened to the crankshaft by cap screws. It is easential that the flywheel is firmly fixed to the shaft or a knock will result. If there is any play the cap screws should be removed and larger ones substituted.

The camshaft is retained by a thrust washer, which is located in the front of the case, directly in back of the distributor drive gear. This thrust washer is fastened in place by two nuts on two studs, and must be removed. The camshaft may then be pulled from the case toward the front. Unless the crank case is turned upside down the tappets will fall against the cams and cause trouble. The three camshaft bearings are retained by set screws, which are located in the top of the crank case, directly above the camshaft centre line.

Unless there are signs of extreme wear none of the timing sprockets need be removed from their respective shafts. The outside sprocket on the camshaft is retained by a nut and keyed to the shaft; it may be removed with a wheel pulier. The small gear on the camshaft is retained by a pin in the hub; when this pin has been driven out the gear may be pulled from the shaft. Both the gears on the crankshaft may be pulled off with a wheel puller after the left hand nut has been taken from the end of the shaft.

Exploring the Oiling System.

It is of the utmost importance that all of the oil passages are free from dirt or sediment. From the flywheel housing the oil is thrown by centrifugal force through a U shaped tube to the distributing centre, where it is carried through a strainer to the oil header, from thence it is forced to the crankshaft bearings, the chains and the tappets. All of the passages should be flushed with kerosene oil and cleaned by means of a stiff wire. The small passages in the crankshaft should also be cleaned in the same way.

The transmission assembly should be removed from the car. After all of the control rods have been taken off the cover upon which is mounted the speed control should be unbolted from the housing and the steel cover over the universal joints slipped back, exposing the bolts holding the joint together. When these bolts have been taken out the transmission with clutch may be taken from the chassis. The drive shaft assembly is disconnected from the rear axle in the same manner.



It takes you beyond just fair service. It helps your car give EXTRA GOOD Service. It is a specially prepared lubricant far superior to common grease. Its name is



NON-FLUID OIL holds down friction to the point of harmlessness. It effectively guards against wear and abrasion. Unlike grease, NON-FLUID OIL lubricates instantly without the aid of frictional heat. It cannot melt, does not freeze, is always and at all times safe-guarding your motor car investment.

"K No. 00 Special" grade is for gears; "K No. 000" grade for bearings. Write for samples and a new book, "Lubrication of the Motor Car."

New York and New Jersey Lubricant Co., 165 Broadway, N.Y.







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The highest quality lowest priced lamp produced
With Mirror - 86 00
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CULVER-STEARNS MFG. CO.,

Worcester, Mass Detroit, Mich



Harvey to the Rescue

A broken spring—a frenzied customer calling for help—demanding a new spring "rush"! It's an odd size; you have none in stock to match it! And yet, you realize the importance of giving this customer real service, not particularly for the profit in this one job alone, nor even for the trade of this one customer, but because service at a time like this will bring the word-o'-mouth publicity which follows naturally when a customer is pleased.

So you call Harvey

to the rescue. There's a Harvey Jobber near you, you get him on long distance, in a few words tell him your needs, and then turn to your customer with the satisfied feeling of work well done, because you know that already the exact spring you want and the best spring money can buy is speeding to you.

"That's aggrice"! invest the customer. And when

"That's service"! says the customer. And when his car is on the road again he tells his friends about it and they say with him, "That's service"!

That is Service, Harvey Service, and it's always ready to help you build a business that will be respected far and near. They may forget the name of the spring you used but the memory of the service you have given will never be lost.

There's A Harvey Jobber Near You

Drop us a card and we will send you his name and our Spring Book giving complete weights, styles, measurements and prices of over 900 different kinds of springs. Write today—you may need Harvey Help tomorrow.

Harvey Spring & Forging Co. 915 17th St., Racine, Wis.

The first step in the disassembly of the transmission is the removal of the clutch assembly. The clutch release yoke, which is keyed to the clutch pedal shaft is pulled from the shaft and taken from the housing. On the model N machines, located at the front of the discs, resting against the crankshaft, is a nut, which is kept from turning while in the machine by set screws. This nut is screwed on to the transmission driving gear and holds the disc assembly of the clutch together. On the model K machines the nut is retained in the same manner, but screws into a sleeve rather than on to the gear as in the model N. After the lock screws have been taken out the nut should be removed, permitting the removal of the disc assembly, together with the thrust bearing.

When the disc assembly has been taken from the housing the clutch springs may be compressed in a vise and the studs removed; this will permit the removal of the clutch discs. The front covers of both the model N and K transmission gearsets are held to the housing by bolts, which should now be removed, permitting the removal of the driving gear, together with its bearings.

The countershaft gears are mounted upon the constant mesh gear and fastened to it by a key and pin between the two small gears. Drive out this pin and the constant mesh gear may be drawn from the front of the case, while the three-gear casting may be removed through the top of the case. With the gears removed the roller bearings may be driven from the housing, after the set screws have been taken out.

The rear bearing of the main shaft is retained by a collar, which is fastened to the housing by screws. These screws may be taken out and the shaft with flange (model N), or with universal (model K), removed, leaving the sliding gears in the housing to be removed through the top.

After the universal joints have been disassembled from the drive shaft, either main member may be removed and the shaft slipped from the housing. The universal is keyed to this shaft and retained by a nut. When the nut is removed the universal may be pulled off with a wheel puller.

Adjustments on the Rear Axie.

In making repairs and adjustments on the rear axle it will be unnecessary to remove the whole housing, for the differential may be removed without disturbing the wheels or removing the springs. The first step is the removal of the bolts holding the wheel flanges to the wheels, then these are taken out, the driving flanges, together with the axles, may be taken from the car.

The differential assembly is mounted on the casing, which carries the pinon gear and rear universal. The nuts should be removed and this casing taken out of the rear axie housing. Both the pinion gear and differential assembly are mounted on ball bearings. Two caps, which are retained by two nuts each, hold the differential bearings in place. When these are removed the differential housing may be lifted out, together with the bearings, which may be taken from the housing. Eight cap screws fasten the two parts of the differential housing together; remove these and the differential is disassembled.

In removing the pinion gear assembly with bearings the first step is the removal of the gear with a wheel puller. This gear is keyed to the shaft and retained by a lock nut, and when removed the shaft may be slipped from the bearings. The front bearings are retained in an adjustable collar, which may be unscrewed from the housing, while the rear may be driven from the housing with a wood or metal bar, taking care to drive upon the outer race.

Examination should be made of all bearings in the rear construction, and should the bearings or bushings show wear replacement is advisable, for any looseness will be evidenced by the groaning or grinding of the axle while the car is in motion.

Pinion and Drive Gear.

The proper adjustment of the pinion and drive gear is a matter of extreme importance and this adjustment is made very easily upon either of the models N or K. The differential should first be assembled together with the pinion gear and shaft. It is essential that all of the bearings are clean and bottom against their respective seats.

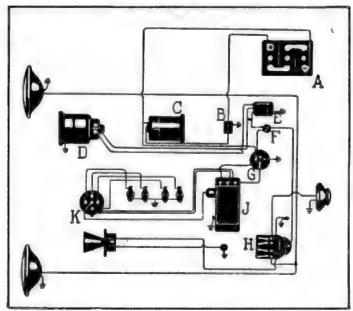
To the universal joint flange upon the pinion shaft fit a wooden handle so that this shaft can be turned by hand, then turn the pinion adjustment until there is no play in the shaft. The shaft must not bind, however. The backs of the pinion and master gears should be together and a slight amount of clearance left between the gears. The pinion shaft should then be turned and the results noted. If the gears bind the differential adjustments should be made to carry the gear farther away from the pinion.

When the adjustments have been made properly there will be no bind and but little lost motion. The two differential bearings should then be tightened and the lock screws put into place. The differential and pinion assembly may then be returned to the rear axle housing.

Rear Wheels and Steering Gear.

The rear wheels are held on to the housing by large lock nuts. The bearings are forced on to the housing and may be removed with a wheel puller. The front wheel retaining nuts are exposed by the removal of the hub caps. When the front wheels are replaced a slight amount of play should be left or the roller bearings will be destroyed very quickly.

The steering gear housing is in two sections, the lower or main part carries the steering arm and is bolted to the frame; the upper part, which is retained by four screws to the main housing, carries the thrust bearing and steering column. This part should be taken from the main housing, allowing the re-



Wiring Diagram for Westinghouse System, Cars from 60,000 to 75,000. A, Battery; B, Starting Switch; C, Starting Motor; D, Generator; E, Voltage Regulator; F, Ammeter; G, Ignition Switch; H, Lighting Switch; J. Spark Coil; K, Distributor.

moval of the steering column, together with the sliding blocks. As this assembly is taken from the housing the blocks separate from the worm. The rest of the mechanism may be exposed by removing the cover plate on the side of the main housing.

Timing and Adjustments.

In replacing the silent chain on the timing sprockets it is essential that the camshaft and crankshaft bear the proper relationship to each other. The proper setting may be determined from the markings on the flywheel. Turn the flywheel until the mark E-C, 1-4 is directly on the top and turn the camshaft in a counter clockwise direction until the exhaust valve of either one or four cylinder is just closing, then put on the chain.

To check up this timing turn the engine over until the piston in number one cylinder is at the top of its stroke. The exhaust valve on number four cylinder should be just closing and the inlet just beginning to open.

Ignition is had by the Atwater Kent system, automatically and manually controlled. Cars fitted with the automatic control are timed as follows: Turn the crank until number one pistor is at the top of its stroke and the mark 1 and 4 CL is



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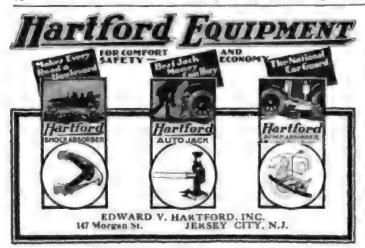
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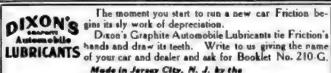








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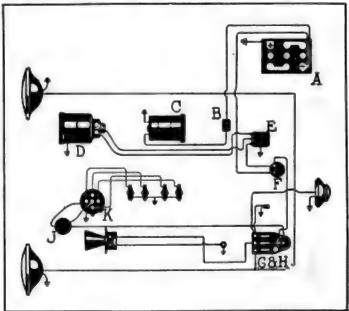


directly on top of the flywheel, then continue to turn it until the mark is past the top centre about two inches. With the engine in this position loosen the large hexagon nut just beneath the distributor, then rotate the distributor in the opposite direction to which the timer shaft revolves, slowly, until a click is heard. Then without allowing the distributor to move, securely clamp the hexagon nut in place. The distributor segment will be opposite one of the secondary terminals. This terminal should be connected with number one cylinder, the other terminals should be connected in the firing order 1-2-4-3, in the direction which the distributor brush travels.

On cars fitted with the manual control the spark lever should be set in a horizontal position, the two nuts on the control rod connecting the distributor loosened and the engine timed as directed for the automatic advance.

The carburetor is a Zenith and beyond cleaning requires no adjustments. Both the main and compensating jet have certain sized openings, made at the factory, so that unless the jet is replaced with a new one there cannot be any change made.

Model K machine was equipped with a Westinghouse single unit starting and lighting system. The motor-dynamo was of the third brush type Westinghouse, with grounded wire. The wiring diagram for this type is very simple and is shown, together with ignition system, herewith.



Wiring Diagram for Westinghouse System, Cars After 75,000. A, Battery; B, Starting Switch; C, Starting Motor; D, Generator; E, Voitage Regulator; F, Ammeter; G and H, Ignition and Lighting Switch; J, Spark Coil; K, Distributor.

Two electrical systems for starting and lighting were used on the model N machines, the Bijur and the Westinghouse. The Bijur equipment covers cars up to 60,000, the Westinghouse from 60,000 on. Two styles of switchboards were used on the Westinghouse system, the first on cars between 60,000 and 75,000; the second style having three fuses only, on cars after 75,000. The three wiring diagrams are reproduced herewith.

The output of both the Westinghouse single unit on the model K car and the Bijur generator on the model N machines is controlled within certain limits by the position of the third brush. If the current generated is over 12 amperes there is danger of ruining the battery through overcharge, and it is essential that the output be lowered. This is done by swinging the third brush opposite to the rotation of the armature to such a point that the current generated is at the required point.

The output of the later Westinghouse generator on machines numbered after 60,000 is controlled by a current regulator unit, indicated in the wiring diagrams by the letter E. The adjustment of this unit should be made only at a service station.

1917 SALES

FOREIGN BUSINE SS\$90,958,243.00

From National Automobile Chamber of Commerce, 7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Per Cent. Decrease in Shipments to Great Britain, France and Russia During Last Fiscal Year—Big Increases to All Other Countries—Shipments Total 80,811 Cars, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less—Fewer Trucks and More Passenger Cars.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917, the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analyzing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased shipments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe.

Exports of commercial vehicles and passenger cars during the two years were as follows:

16 19:

No. Value No. Value Commercial.... 21,265 \$56,805,548 15,977 \$42,337,315 Passenger..... 56,234 40,660,263 64,834 48,620,928

, Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14,468,-233 less, the shipments of passenger cars increased by 8600 and their value by \$7,960,665.

Great Britain and France were still our largest markets, despite their heavy failing off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all trucks and amounted to \$14,691,460, as compared with \$19,137,904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries, Holland and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries, Canada is America's best customer for motor cars, having increased her purchases by nearly \$4,200,000—from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647—an increase of \$1,248,735 over the year before.

by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took antomobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States exported in the last fiscal year 23,435 automobile engines, valued at \$2,844,406; tires worth \$12,330,201 and parts worth \$27,284,932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

If you are a member of the Forsign Trade Bureau conducted by the Automobile Journal Publishing Company you can reach 8,000 foreign buyers of pleasure cars, trucks, fittings, supplies, accessories, tools and equipment in more than 81 foreign countries.

ALL FACTS AT REQUEST

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FOR SMALL TIRES

Racing Car on Providence Speedway Track, Equipped with Doughty 30x31-2 Tires, Driven 100 Miles Faster Than One Mile per Minute— 68 Miles an Average of 55 Seconds per Mile, this at the rate of 65 miles an Hour, and equivalent to larger tires of 73 to 75 miles per hour.

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The inbuilt speed, stamina, spring and vitality that successfully withstand the burn, grind and pommelling of the race course, are the qualities in Tires that assure extreme satisfaction in actual service.

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Saving in Steam.

Saving in Labor.

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INDEX TO ADVERTISERS



EAGLEINE OILS

are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

These are the claims of thousands of motorists,—some with years of experience, who want full value, and more who know the value of high grade lubricants, and who know when they obtain satisfaction.

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A SUBSCRIPTION to the Automobile Journal makes one of the most acceptable, useful and valuable of gifts to your motorist friend. Send orders early in order that the recipient may have the yuletide gift promptly.

F there is one thing more than another that the condition of a foreign war has emphasized, it is the essentiality of motor cars. After a period of disturbance natural to the adjustment of the industry to government demands, a more settled market is to be anticipated. If prices rule higher on new cars and used cars, as a number of large trade interests indicate, it is simply an effect to be expected from such curtailment of production as war needs may To the motorist necessitate. whose needs for quick transportation are more liable to increase than to decrease during the period of the war, it is almost needless to say there is no time like the present to make purchases of cars and car equipment.

I JNIFORM traffic laws throughout a state, such as New York is establishing. has aroused quite a sentiment in New England for a larger cooperation, which will be beneficial to the motorist. If so great and important a touring section as the six states which comprise New England will take up the matter seriously, arranging for uniform traffic laws, marking of routes and licensing, as advocated by the National Automobile Association, it is believed another great forward step will have been taken. Important legal decisions and other valuable information are also found in the association's section in this issue of its official Journal. Send application for membership to 9 Park street, Boston, Mass.

VOL. LXIV. NOV. 25, 1917. NO. 8. ONTEN Essentiality of the Car..... Urgency of Its Use Seen Under Current Conditions. Autocruiser on Denby Chassis,...11 Doughty Tires Remarkable Test..12 Cars of the War Camps.......15 Fashions of Motordom......20 By Mrs. A. Sherman Hitchcock. Mocking the Mercury in the Latest Motor Raiment. National Automobile Association 23 Including an Interesting Series of Legal Decisions. Dixle Highway Military Test....27 Accessories and Equipment.....28 Garages-Plate XIII......30 Two Car Structure with Chauffeur's Room Overhead. Shows and Coming Events.....32 Graphic Items......33 General News of the Industry....34 Overhauling the Automobile.....36 General Engine Repairs Given Special Discussion. Rise of a Big Agency......39 Queries42 Advertisers' Index...... 2 -:::-Treasurer . . WILLIAM H. BLACK Secretary . . , . D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

COLD weather came with a rush on the eastern seaboard and it caught many motorists unawares in the regard of supplying themselves with supplies for the car and garage. A fine analytical study of various types of winter heating equipment is included in this issue. The products shown, tested ones of high quality and superior efficiency, commend themselves to all motorists who wish to give their cars proper care and insure themselves quick and efficient winter transportation.

DESPITE the distracting influences of war conditions and war necessities, the eyes of all motordom turn to the great national shows at New York and Chicago, which will disclose to all the cars and products of 1918. These big events come soon after the Christmas holidays. Plans for the first, the New York exhibition, are being completed rapidly. annual big show number of the Automobile Journal will have a very important section devoted to the models of 1918, the makers, car production and constructional details. Replete with information and lavishly illustrated, this issue of the journal fills the function of an indispensable guide to show visitors and members of the industry.

FUEL saving suggestions of the National Automobile Chamber of Commerce remind the motorists of America that this is an avenue of conservation that saves at both ends, benefiting our boys and the Allies "over there," as well as benefiting themselves here.

A TTENTION is again called to the practical mechanical questions in the Queries department on page 41, containing suggestions no one can afford to miss. The prize letter subjects are open to all readers.







is sure of with the use of a motor car. He is able to accomplish more. Don't think that the demand is less-it is greater-but the reasons for buying have changed.

"You must understand and interpret these new reasons properly. Awaken in each prospect the present day possibilities with the aid of an automobile."

Save Fuel; Use the Car; Keep Good Health.

Still another instance of the position of the motor car in the economic welfare of the country was cited by Alfred Reeves, General Manager of the National Automobile Chamber of Commerce, in a statement issued by the organization.

"Automobilists," said Mr. Reeves, "are keen to help the government and are co-operating to avoid waste of fuel. People must use cars and more than 40 per cent. of our 4,000,000 cars are used strictly for business purposes, with a big percentage of the balance of passenger cars used in some degree for utility purposes. It is very hard to draw the line where utility with an automobile ends and so-called pleasure riding begins. President Wilson's form of relaxation from governmental cares is an automobile ride every afternoon-a

necessity for his continued good health.

The cry of "non essential" against the motor car is more anomalous at this time than at any other time in the history of its development, as the call across the land is for more transportation facilities and means of relieving the congestion on the railroads. What else can fit in this widening gap in the economic conduct of the country's business if it is not the motor car. There will not be enough trucks to meet the emergency, a fact which has already been recognized by some of the largest concerns in the motor industry, who have plans well along toward completion for a gigantic scheme of employing all classes of motor cars to take up the burden of transportation requirements. The B. F. Goodrich Co. of Akron, O., has started a campaign along these lines on a comprehensive scale and in keeping with the government's "Farmer to consumer plan."

Importance in Garnering Food.

The Goodrich National Touring Bureau, cooperating with automobile clubs throughout the United States, is preparing to launch a campaign next year to bring the motorist in closer touch with the farmer, so as to enable him to purchase necessities direct from the fields without freight delays and at reduced cost.

The government for a long while has been attempting to promote and stimulate a scheme whereby foodstuffs can be brought direct from the farms to the consumer without entailing delays that might be disastrous to the shipment and Congress is being asked to sanction an automobile and motor truck collection system which would relieve the railroads. including the establishment of service bureaus in cities for the benefit of the man with an automobile at his disposal.

With such systems in operation there would be no motor cars that could be classed solely as pleasure vehicles, except possibly a scattering few, but it is also true that thousands of people still use the railroads for pleasure tours, a fact, however, which does not call for suppressing the passenger coach.

Another outlet and market for used cars has already developed, which promises to be very extensive in its effect on prices. New York dealers in used cars are exporting them to Japan and the South Sea islands, where they sell for three to four times what they bring here. These cars are thoroughly overhauled before being shipped and are found perfectly satisfactory by the purchasers. One New York dealer is reported to have exported 100 used cars to Japan and another shipment of 20 to Java is reported.

It is also reported from New York that some of the used car dealers are making no urgent effort to dispose of their stocks, but are storing them in anticipation of the higher prices which they confidently expect to obtain in the spring.

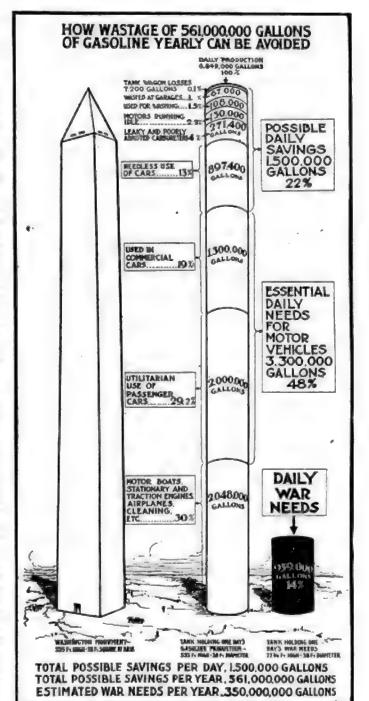
N. A. C. C. SUGGESTIONS TO SAVE GASOLINE.

1. Store gasoline in underground steel tanks. Use wheeled steel tanks with measuring pump and hose. They prevent loss by fire, evaporation and spilling.

2. Don't spill or expose gasoline to air—it evaporates .

rapidly and is dangerous,

Don't use gasoline for cleaning and washing-use kero-



sene or other materials to cut grease

4. Stop all gasoline leakages. Form habit of shutting off gas at tank or feed pipe.

Adjust brake bands so they do not drag. See that all bearings run freely.

Don't let engine run when car is standing. It is good for starter battery to be used frequently.
 Hare varburetors adjusted at service stations of car-

buretor or automobile companies-they will make ordinary ad-

justments without charge. 8. Keep needle valve clean and adjust carburetor (while engine is hot) to use as lean mixture as possible. A rich mixture fouls the engine and is wasteful.

9. Pre-heat air entering carburetor and keep radiator covered in cold weather—this will insure better vaporisation.

10. See that spark is timed correctly with engine and drive with spark fully advanced—a late spark increases gas consumption.

11. Have a hot spark, keep plugs clean and spark points properly adjusted. Avoid high speed. The average car is most economical 12.

at 15 to 25 miles an hour. 18. Don't accelerate and stop quickly-it wastes gas and

wears out tires. Stop engine and coast long hills.

14. Cut down aimless and needless use of cars. Do a number of errands in one trip.

Know your mileage per gallon. Fill tank full and divide odometer mileage by gallons consumed.

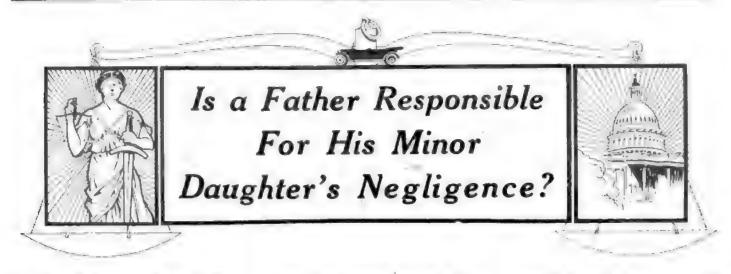












Y A RECENT decision of the Court of Appeals of Virginia, considerable interesting light is thrown upon the responsibility of a father for the negligence of his minor daughter in operating the family automobile.

The plaintiff in the case was crossing a public highway when he was struck by an automobile owned by the defendant and operated by his daughter, a minor of 19 years of age, and brought this action to recover damages from the father for the alleged negligence to his

daughter.

It appeared that the defendant bought and kept the car for the use and pleasure of himself and family. He was a deputy sheriff, and also used the car sometimes to discharge his official duties. The daughter was a careful and experienced driver and on the day of the accident she sought and obtained permission from her father to use the car that afternoon for the pleasure and entertainment of herself and her cousin. It affirmatively appeared that the daughter was not using the car on an errand or business of the father, but was driving alone for the pleasure and entertainment of herself and friend.

The controlling question in the case is presented by opposing instructions requested by the plaintiff and the defendant, respectively. The instructions offered by the former embodied the proposition that if the defendant purchased the automobile for the use and pleasure of himself and family, and at the time of the accident his daughter was a member of his family and under 21 years of age, and was using the automobile for ber own pleasure and the entertainment of her friends, with the knowledge and consent of the defendant, then the defendant was liable for the negligence of his daughter to the same extent and in like manner as if he personally, at the time of the accident, had been driving The opposing instructhe automobile. tion requested by the defendant in effect was that in order to render the defendant liable for the negligence of his daughter it must have appeared by a prepanderance of the evidence that at the time of the accident she was operating the automobile in transacting some business, or in the management of some affair of the defendant, and by his authority.

The court rejected the prayer of the plaintiff and gave the instruction requested by the defendant, which ruling resulted in a verdict and judgment for the defendant.

The Court of Appeals of Virginia says that two theories are advanced why the owner of an automobile should be liable for injuries inflicted upon third persons by his minor child while using his machine, with his consent, for the child's own pleasure and business, namely:

First, because the parent is responsible for intrusting the dangerous machine in the hands of his child. This liability, it will be observed, does not depend upon the child's negligence, but upon that of the parent in permitting the child to use a dangerous instrumentality.

Second, the second theory proceeds upon the assumption that the parent originally purchased the machine for the use and pleasure of the family, the use of it by the child with the parents' permission for its own pleasure is but applying it to the business for which it was bought, and, therefore, the child's use of it was for the parents' business.

In a former decision of this court it was held in answer to the first proposition, that an automobile is not such a dangerous machine or agency as to make applicable to it rules requiring extraordinary care in the use and control of instrumentalities which are dangerous to

The second proposition is discussed in a New Jersey case as follows:

It bases the creation of the relation of master and servant upon the purpose which the parent had in mind in acquiring ownership of the vehicle and its permissive use by the child. This proposition ignores any rational element in the creation of that status as to third persons, that such use must be in furtherance of and not apart from the master's service and control, and fails to distinguish between a mere permission to use and a use subject to the control of the master connected with his affairs. The reasons for liability is founded upon the idea of control which a master has over his servant. The court, although atlempting to rest the liability upon the relation of master and servant, yet actually tested the liability by the fact that she was intrusted with the operation of the machine for her own pleasure, purchased for that object, whereby she ipso facto became a servant. So that the judge thus in fact left the legal relationship of master and servant out of account, and rested it in name only, because the daughter was allowed to drive the machine. In this there was error.

In a recent New York case it was held that it has always been supposed that a person who was permitted to use a car for his own accommodation was not acting as agent for the accommodation of the owner of the car

The attempt is made, however, to reconcile these apparently contradictory features of this proposition by the assertion that the father had made it his business to furnish entertainment for the members of his family, and that, therefore, when he permitted one of them to use the car for the latter's personal and sole pleasure, such one was really carrying out the business of the parent, and the latter thus becomes a principal and liable for misconduct. This is an advanced proposition in the law of principal and agent, and the question it presents really resolved into one of whether as a matter of common sense and practical experience we ought to say that the parent who maintains some articlefor family use and occasionally permits a capable son to use it for his individual convenience, ought to be regarded as having undertaken the occupation of entertaining the latter, and to have made him his agent in this business, although the act being done solely for the benefit of the son. That really is about all there is to the question.

Not much can profitably be said by way of amplification or in debate of the query whether such liability would rest upon reasonable principles; whether it would present a case of such theoretical and attenuated agency, if any, as would be beyond the recognition of some principles of law, as they are originally applied to that relationship. The question largely carries on its face the answer which ever way it may be made. I'nquestionably an affirmative answer has been given by the courts in some of the states * • •

Resting our decision upon the precise facts of the case in hand, which are practically undisputed, we hold that relationship standing alone does not render the father liable for the acts of his minor daughter; that such a liability must result from the relationship of master and servant, or principal and agent; and that the absence of that element of responsibility in this case affirmatively appears.

PERTINENT STATEMENTS ON HOW NOT TO CROSS A STREET.

In a recent case before the Supreme Court of Pennsylvania, it appeared that the plaintiff charged the defendant with the death of her husband, due to the negligence of the chauffeur of the defendant. It appeared that the plaintiff's husband was attempting to cross a street in the city of Philadelphia; he saw and avoided the motor truck of the defendant, but in doing so stepped backward in front of a street car, which was approaching in the opposite direction, and which he did not see, but which he could have avoided if he had looked.

The court said that it must be remembered that the motor truck did not strike the plaintiff's husband, but that the immediate cause of his death was his own act in stepping backward directly in front of a trolley car. The trial judge instructed the jury that there was no evidence in the case that the motor truck was being driven recklessly or at any excessive rate of speed. The plaintiff's husband saw it approaching him, so that no further warning to him was necessary. Had there been nothing in his way when he stepped backward, it is likely that he would have had no real cause of complaining against the driver of the motor truck. He evidently did not hear or see the trolley car, although it was within plain sight and almost within touch. It is difficult to see in the evidence anything from which negligence upon the part of the chauffeur can be fairly inferred. He had his truck under control and brought it to a stop within a few feet; he did not strike the plaintiff's husband and the inference that he would have done so had the plaintiff's husband remained standing where he was was not justified. It is quite as probable that he would have been able to stop his machine or turn it to one side. On the other hand, the evidence of contributory negligence upon the part of the plaintiff's husband is clear. 'He paid no attention to the approaching trolley car, but stepped backward directly in its path. Had he raised his eyes for an instant and looked in the direction in which it was coming he would have seen the trolley car and common guidance would then have caused him to pass directly to the curb, or if he thought the motor trick too near for that he could have taken a few steps directly to the north and thus have avoided contact with either the motor truck or trolley car.

There was no occasion for him to step directly backward into the right hand corner of the fender of the car. Nothing but fallure to observe its presence can account for his action in that respect. The conclusion is irresistible that failure to look for the approaching trolley car with which he collided was the direct cause of the injury. The plaintiff's husband's attempt to cross the street between two vehicles, both in plain sight, approaching in opposite directions, one of which he saw and avoided, and one of which he evidently did not see, but which he could readily have avoided, if he had looked for it before stepping directly in its way. He was, therefore, guilty of contributory negligence.

MOTOR OWNER NOT LIABLE FOR INJURY TO A GUEST.

The Supreme Judicial Court of Massachusetts has just decided an interesting case holding the owner of an automobile not liable for an injury to a guest while riding in the owner's car.

It appeared that the plaintiff, while staying as a guest of the defendant, went out with the defendant in her automo-The automobile was driven by a chauffour furnished by the garage where it was kept. Through the negligence of the chauffeur the automobile was overturned and fell on the plaintiff, causing the injuries complained of. The jury found that while driving the machine the chauffeur acted as the defendant's servant, and this finding was warranted by the evidence. The jury also found that the accident was caused by the negligence of the chauffeur. Upon the jury making these findings the judge directed them to return a verdict for the defendant and reported the case to the Supreme Court.

In a previous case (West va. Poor 196 Mass. 185), the court said that the defendant who invites a plaintiff to ride gratis in his carriage is liable to the same extent that a gratuitous bailee is liable. In the case under discussion the plaintiff asked the court to overrule this former decision in at least one respect. The court, after considering many English and American cases, held that it is plain that in England the liability of a gratuitous bailee and the liability of one who undertakes a gratuitous transportation is the same. And to this one thing there must be added, namely:

However much our English judges have quarreled with the meaning of the words "gross negligence," it is a fact that when pushed to a decision the judges of England have invariably held that to make out liability in case of a gratuitous undertaking (no matter what the nature of the gratuitous undertaking was), gross negligence has to be made out.

In holding that to charge a defendant with liability in case of a gratuitous undertaking to transport a person, the plaintiff must prove gross negligence because that is the measure of liability in case of the gratuitous undertaking or

keeping and carrying goods, it is not to be understood that gross negligence in the two cases is the same thing. In all cases (no matter whether the case is a case of ordinary or of gross negligence), the consequences likely to result is a fact to be taken into consideration in determining what ought to be done by the defendant to fulfill his measure of liability. For example: It might be held that the omission to do a certain thing in the transportation of goods was not negligence and that by reason of the seriousness of the consequence likely to result the omission to do the same thing in case of a transportation of a person would be negligence, and so in case of gross in place of ordinary negligence, This brings us to a consideration of the case upon which the plaintiff has placed great reliance. In that case it was decided that the defendant society was liable to the plaintiff who had been invited to attend a conference held in the defendant society's church at which the plaintiff was not a delegate, for injuries suffered by the plaintiff through a dangerous condition in the path leading to the church upon the jury finding that the defendant was negligent in the matter.

THIS DOCTRINE FURTHER EXAMINED.

That case has usually been cited when the doctrine that a charity is not liable for torts under the decision in McDonald vs. Massachusetts General Hospital has been set up for defense. It has never been affirmed as a decision upon the duty owed by a defendant who invites a plaintiff to enter upon his (the defendant's) land solely for his (the plaintiff's) purposes unless it can be held to have been affirmed or approved on that point by what was said by Mr. Justice Barker in the case of Chapin vs. Y. M. C. A. Of the decision in the case of Davis vs. the Central Congregational Society, it is to be observed that it was decided at a time when the distinction between a person going on the premises of the defendant for business to be transacted with the defendant and persons going upon those premises for business of their own had not been established. Were the case to arise today it might be contended that since the plaintiff in Davis vs. Central Congregational Society went on the defendant's premises for her own purposes she was in no better position than the plaintiff in Plummer vs. Dill and Hart vs. Cole. It is hard to see a distinction between the rights of a plaintiff expressly invited to attend a church conference to which she was not a delegate and a plaintiff impliedly invited to attend a funeral or a wake. But, however, that may be the decision in Davis vs. Central Congregational Society has no bearing upon the question before us. Whether one invited to come on to the defendant's premises for his (the invitee's) purposes alone takes them as he finds them or can hold the defendant for negligence in case the premises are in a dangerous condition for that reason is a question of the liability of one who enters upon a

gratuitous undertaking whether it be a gratuitous undertaking to keep, carry or lend.

As a matter of authority the case desired to be overruled ought not to be overruled. It must be taken as established in this commonwealth that to charge a gratuitous bailee the plaintiff must make out gross negligence on his The measure of liability of one who undertakes to carry gratis is the same as that of one who undertakes to keep gratis. To this is to be added the fact that in every case in England in which the question of the measure of liability of a person who enters upon any gratuitous undertaking has arisen the same conclusion is reached.

Justice requires that the one who undertakes to perform a duty gratuitously should not be under the same measure of obligation as one who enters upon the same undertaking for pay. There is an inherent difficulty in stating the difference between the measure of duty which is assumed in the two cases. But justice requires that to make out liability in case of the gratuitous undertaking the plaintiff ought to prove a materially greater degree of negligence than he has to prove where the defendant has to be paid for doing the same thing. It is a distinction which 75 to 195 years' practise in this commonwealth has shown is not a too indefinite one to be thrown out by the judge and acted upon by the jury.

PAINT LIGHT BULBS TO MEET LAW

Each Automobile Shall Illumine But One-Half the Road, Originator of the Idea Explains

HE new headlight law, which went into effect in New York state Nov. 1, has been given very serious consideration by the New York State Motor Federation, which reports that it has approved of 28 devices to comply with the law.

The New York citizen, who is responsible for the idea embodied in the law, says that the law can be complied with in a very simple and inexpensive manner, and that no special appliance is necessary. What confusion there has been, he says, has arisen from failure to read the law itself and in giving heed to reports of what the law maintained.

The main requirement is that there shall be a light ahead for 250 feet, but not over 42 inches high, to the left of the axis of the car, at a distance of 75 feet or more. Some of the reports sent out omitted "to the left of the axis," and that was entirely misleading, as this is the key to the law, for the principle involved is that each automobile shall light but one-half of the road. Therefore "to the left" means that there is not restriction as to the height of the light in front

or to the right of the car.

"It is a simple thing to comply with the law," the inventor says, "and any car can be equipped to do so in a few minutes and at a cost of but a few cents. This is the way: Paint the right side of the light bulbs green and at the tip of the bulb make a circle of green paint one half the diameter of the bulbs. The paint should cover the right hand side of the bulb, looking with the car, for an arc of 150 degrees. In order to insure quick drying the paint used should be mixed with about one-half turpentine. In placing the bulbs in the reflectors the painted part should extend 10 degrees to one side of the vertical centre of the reflector at the bottom. Care should be taken that the bulbs are focussed so that the light is thrown far ahead and to the right. The result will be to leave a dark

area to the left, as the law calls for, but the reflected light straight ahead and to the right will give plenty of illumination to drive anywhere, and these strong beams will be found to meet the conditions that the light be sufficient to reyeal any object in the road 250 feet ahead. By a slight changing of the positions of the bulbs in the reflector the same lamp can be made to comply with the headlight laws in New Jersey and Massachusetts.

'I claim this principle is the solution of the headlight problem. It has to be seen at work in order to be appreciated. I discovered it more or less by accident. When the subject of an automobile headlight law was brought up for this state 1 thought as a matter of public spirit, for there is no gain in it for me, that I ought to place it before the Legislative Committee having the matter in charge. After a number of demonstrations before Senator Hewitt and others the idea was incorporated into a law.

"At first driving with such lights gives an odd sensation, for telegraph poles, fences and trees are brilliantly lighted, but everything to the left of the centre of the road is in darkness. This causes one to keep well to the right, and the practical effect is to prevent one from 'hogging' the road. To light the left side of the road momentarily a slight turn of the steering gear is all that is necessary. Pedestrians that are overtaken have their backs to the road and are not affected. I have met and passed automobiles, moving vans, horse drawn vehicles and pedestrians without throwing any light on them when they were on the right side of the road. By this method of lighting there is no danger of a collision, for nothing can be run into which is not in the lighted area."

A line of motor 'buses has been placed in operation between Chicago and Camp Grant, the cantonment near Rockford, Ill.

TO MAINTAIN AN AUTOMO-BILE'S EFFICIENCY.

In order that an automobile's efficiency may be constantly maintained, motorists are advised to look for the following troubles, thereby saving considerable annoyance and expense:

Faulty Ignition-

Spark advanced too far.

Spark too late, causing overheating. Short circuits in ignition system, causing irregular spark.

Wrong timing of ignition system: too early, too late, or wrong order.

Dirty distributor, misdirecting the current.

Faulty Carburetion-

Preignition, due to excessive carbon deposits.

Rich mixture, causing overheating. Lean mixture, in conjunction with worn parts.

Faulty Lubrication-

Lack of oil.

Lubricants of poor quality.

Excess of oil, causing carbon deposit.

Overheating of Engine-

Fan not working.

Pump parts not revolving.

Radiator clogged.

Pipe line clogged.

Rubber hose defective inside, blocking flow of water.

Ignition time too late.

Faulty Compression-

Engine designed with too high compression, causing preignition.

Mechanical Looseness Due to Improper Adjustment or Wear-

Loose connection rod bearing, crank pin end.

Crank pin bearing out of round.

Main bearings of crankshaft loose.

Bearings too tight.

Wrist pin loose in piston.

Wrist pin loose in upper end of connecting rod.

Wrist pin not in line with crankshaft, causing side slap.

Piston ring loose in slot or broken.

Cam follower guide worn.

Cam loose on shaft.

Camshaft bearing worn.

Worn cams (flat spot).

Flywheel loose on crankshaft (old models with keyed on wheel).

Flywheel out of balance.

Timing gears loose on shaft,

Worn or broken timing gear teeth.

Cylinder loose at its base.

Engine loose from frame.

Piston too small for cylinder, causing side slap.

Poor push rod adjustment-gap too great.

Exhaust or inlet valve sticking guide. Spark plug touching valve.

Magneto coupling toose.

Fan belt coupling striking a pulley.

Fan blades striking something.

Worn cylinder, causing side slap.

Bent crankshaft.



PLATE XIII.

GARAGE WITH CHAUFFEUR'S ROOM OVERHEAD

Substantial Brick Structure Houses Two Cars and Has an Amply Large Upper Room Finished Off at Moderate Cost

Designed by the Architectural Department of The Automobile Journal Publishing Co.

FOR motorists who employ a chauffeur and keep two cars, adequate garage facilities are an economy in the long run and greatly increase the enjoyment to be derived from the motor car, as the owner experiences the peace of mind that comes from knowing that his car is well housed and maintained, and that it is always close at hand and also the chauffeur, if provision is made for the latter.

With the principal structural material, brick, the builder has a choice of a number of finishes that could be selected to match the home. The outside walls are 10 inches thick, with a two-inch air space, and start from the concrete underpinning, which is carried nine inches above grade and formed of concrete as an extension of the foundation walls, also of concrete: Two 12-inch granite tops fit over the entrances in front, balancing the underpinning and adding greatly to the finish of the building. The interior partition walls are four inches thick and of brick. These latter partitions wall off the stairway, coal bin, heater room and toilet from the garage proper.

An ideal arrangement is found in the location of the heater room, as it calls for very little piping to install the radiators in the proper positions. With the two car heating system one series of radiators should be placed on the garage side of the heater room partition and the other on the same side of the coal bin partition, where they will be close to the radiators of the cars when the latter are in the building, assuring warmth even on the coldest nights and an easy starting engine at all times.

Three spacious windows on either side afford ample light for working at the benches and additional ventilation in summer time is provided through two windows in the rear, opening into the heater room and toilet respectively. On the second floor light and air is admitted to the chauffeur's quarters through dormer windows front and rear, each having double sashes.

Two main entrances, each eight feet wide, enable the drivers to run the car directly into the position where it is to be left and run it out again without the difficulty of manouvering it about inside the building. A door on the side opening from the outside directly in front of the stairway gives access to the building without opening the main doors and serves to conserve the heat, and a partition could be built at slight expense making this entrance direct to the chauffeurs quarters

with a second door leading into the garage, serving to prevent the odors of the gas and oil from reaching the second floor.

The foundation walls, which extend three and a half feet below level, are made of concrete 12 inches thick of a mixture of one part cement, two parts sand and four parts gravel or crushed stone. These walls should be extended inside for the chimney foundation and also for the brick interior partitions. Various toilet and drain connections are allowed for in placing the walls and before the cement floor is laid.

A heavier tamper should be used in tamping down the ground inside the walls before the floor is laid. In casting the floor two mixtures should be used, the first, three inches thick, of one part cement, two parts of sand and four parts of crushed stone; the second, one inch thick, of one part cement and two parts sand. In the garage part the surfaces of the floor should be sloped toward the drains to carry off the water readily.

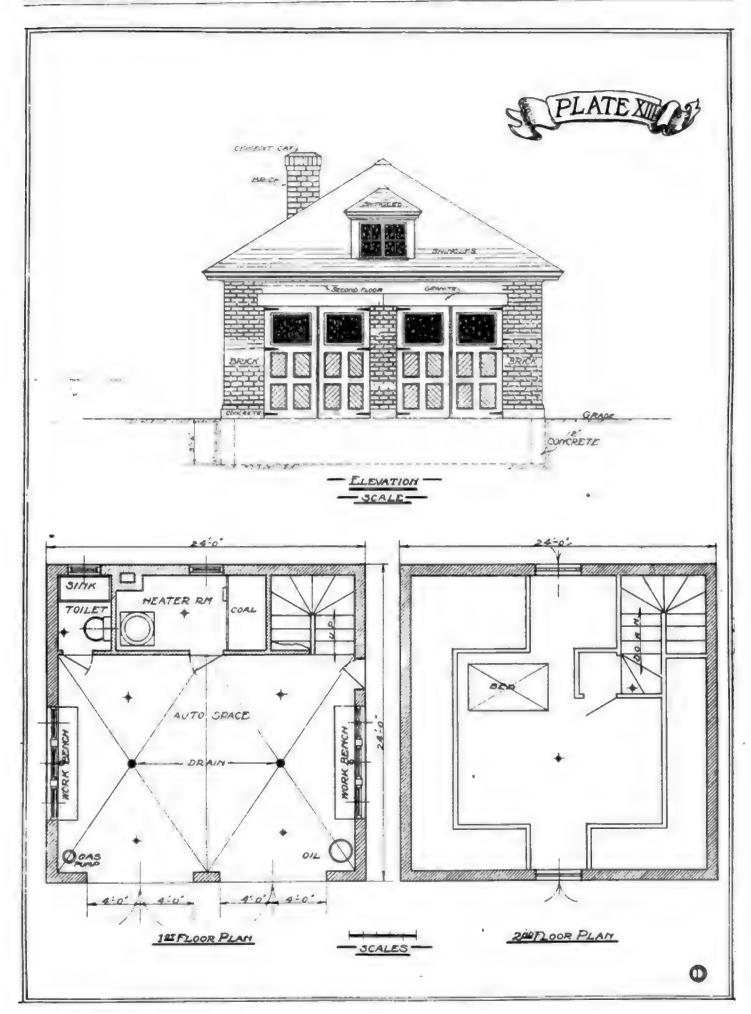
The first floor ceiling is made of plaster laid on metal lathes, nailed to the floor joints, making it fireproof.

The second floor timber specifications are as follows: Floor joists, 2x10 inches, set 16 inches on centres and notched in brick work; flooring, seven-eighths inch hard pine; plates of 2x6 inch spruce, bolted into brick work; hip rafters, 2x10 inches; jack rafters, 2x16 inches; roofing boards, seven-eighths spruce laid two inches apart.

The second floor partitions which wall the living quarters off from the roof members are made of finished off wall board or sheathing nailed on 2x4 inch studs, 16 inches off centre. An amply large room is formed, 24 feet long between the dormer windows and 15 feet wide in the centre, with a small hall leading off to the stairway.

Extra shingles, nailed with galvanized nails, should be used on the roof and dormer roofs and all exterior woodwork should be of white pine stock, seven-eighths of an inch thick. Spruce risers and treads of the same thickness are used in the stairway leading to the upper floor, which has an eight-inch rise.

When finished the owner has a garage that should last a life time; one that is practically fireproof and with a minimum cost for maintenance. With normal labor and material costs the building completed according to the design should not cost over \$2500.



Advance Notes of Big Shows

New York and Chicago National Automobile Exhibitions Preparing Elaborate Stagings.

Norwithstanding the curtailment in motor car production that is in prospect, there is every indication that the New York and Chicago National Automobile Shows will be the largest and most elaborate on record. There will not only be a larger number of exhibitors than ever before in any show in the world, but also a larger number of exhibits, as indicated by the show statistics recently given out by S. A. Miles, manager of the national shows.

The National Automobile Chamber of Commerce and the Motor and Accessory Association alloted space to members several weeks ago and since that time sunnouncement has been made of the additional exhibitors of both cars and accessories who will exhibit and who are not members of either of the associations.

At the New York show, which will be held in Grand Central Palace, Jan. 6-12, there will be 13 new exhibitors of cars and 127 new accessory exhibitors, making a grand total of 95 cars and 245 exhibitors of accessories. All the space on the entire four floors of the building will be taken. The Chicago show will be held from Jan. 26 to Feb. 2 and the number of exhibitors is slightly larger than for the New York exhibition. Some idea of the great growth of the industry and the expansion of the show as an institution is shown in these figures, as 18 years ago, when the first show was held, there were only 51 concerns exhibiting.

The new exhibitors of cars alloted space are as follows: American Motors Corp., Anderson Motor Co., Camden Motors Corp., Comet Automobile Co., Dixie Motor Car Co., Inc., Doble-Detroit Steam Motors Co., Harroun Motors Corp., Maibohm Motors Co., Monitor Motor Car Co. Moore Motor Vehicle Co., Olympian Motors Co., Pan-American Motors, Corp. and Stanley Motor Carriage Co.

The following makes of cars, as members of the National Automobile Chamber of Commerce, will exhibit at the (Gasoline) Abbott, Allen, Apperson, Auburn, Austin, Briscoe, Buick, Cadillac, Case, Chalmers, Chandler, Chevrolet, Cole, Columbia, Crow, Davis, Detroiter, Dodge, Dorris, Dort, Elgin, Eikhart, Empire, Fiat, Franklin, Grant, Glide, Hackett, Hal, Haynes, Hudson, Hupp, Interstate, Jackson, Jordan, King, Kissel, Kline, Lewis, Lexington, Liberty, Marion-Handley, Marmon, Maxwell, Mc-Farlan, Mercer, Mitchell, Moline, Monroe, Moon, Nash, National, Oakland, Olds, Overland, Owen, Packard, Paige, Paterson, Peerless, Pierce-Arrow, Premier, Regal, Reo, Roamer, Saxon, Scripps, Standard, Stearns, Stephens, Studebaker, Stutz, Velie, Westcott, Willys and Winton; (electrics) Ander-Westcott, son, Baker, Milburn, Ohio and Wood.

The Glide, Dorris, Hackett and Stephens will be shown at Chicago only, while the Kline will be exhibited at New York only.

NEW COMPANY WILL BUILD LAUREL 16-VALVE CAR.

The Laurel Motors Corporation, which has taken over the Laurel Motor Co. of Richmond, Ind., is planning the purchase of the former Remy experimental plant at Anderson, Ind., and will manufacture the Laurel car with a new type of motor. The engine will have the Roof 16-valve head, which was developed by R. M. Roof, who has been manufacturing the

head for Ford cars during the past year. The new company will also make engines under the Roof patents for other makes of cars and also the Roof 16-valve head for Fords. The new Laurel car will be on the market shortly after the first of the year. Officers of the Laurel Motors Corporation are: President, W. H. Maston; vice president and general manager, C. E. Hayes; secretary and treasurer, Grant L. Hudson.

WILL HAVE TO PAY TAX ON PASSES TO AUTO SHOWS.

The Internal Revenue Department at Washington, D. C., has ruled that the war tax on admissions to theatres and hails applies to passes for the automobile shows. The only persons exempt are municipal officials on official duty and employees of the show.

As the admission price to the shows is 50 cents all passes will have to pay on that basis or five cents for the tax.



SHOWS.

Akren, O., automobile showDec. 3-8
New York, automobile salon, Hotel As-
torJan. 2-9
New York, 18th annual automobile
showJan. 5-12
Washington, D. C., carnival and open
house weekJan. 11-18
Providence, R. I., automobile show
Jan. 11-19
Philadelphia, 17th annual automobile
showJan. 11-19
Rochester, N. Y., 10th annual automo-
bile show, Exposition Park. Jan. 14-19
Milwaukee, Wis., automobile show
Mantagai 22-n automobile about
Montreal, Can., automobile show
Jan. 19-26
Cleveland, O., 17th annual automobile
showJan. 19-27
Scranton, Pa., automobile show Jan. 21-26
York, Pa., automobile showJan. 21-26
Portland, Ore., automobile show
Jan. 21-26
Mifflintown, Pa., automobile show
Jan. 22-26
Allentown, Pa., automobile show
Jan. 23-28
Chicago, III., national automobile show
Jan. 26-Feb. 2
Chicago, III., salon; Congress hotel
Jan. 26 Feb. 2
Harrisburg, Pa., automobile show
Jan. 26-Feb. 2
Manchester, N. H., academy Jan. 28-Feb. 2
Minneapolis, Minn., automobile show
Feb. 2-9
Kansas City, Mo., automobile show
Feb. 9-16

Kansas City, Mo., third annual tractor show......Feb. 11-16 St. Louis, Mc., automobile show Feb. 11-16 Newark, N. J., automobile show.... San Francisco, second annual automobile show......Feb. 16-24 Waterbury, Conn., automobile show... Des Moines, la., automobile show...Feb. 18-23 Syracuse, N. Y., automobile show...Feb. 18-23 Grand Rapids, Mich., automobile showFeb. 18-23 Springfield, O., automobile show...Feb. 18-23 Pittsfield, Mass., automobile show...Feb. 18-23 South Bethiehem, Pa., car and truck show......Feb. 18-27 Brooklyn, N. Y., motor vehicle showFeb. 22-March 9 Omaha, Neb., automobile show.....Feb. 23-March 2 Boston, Mass., Boston Automobile Dealers' Association show......March 2-9 Trenton, N. J., automobile show.... Stockton, Cal., automobile show....

MEETINGS.

New York, Automobile Electrical Association......Jan. 3-4

New York, Society of Automotive Engineers, annual......Jan. 9-10

New York, National Association of Accessory Jobbers.....Jan. 11-16

Graphic Items From the Fortnight's News

The Automobile Club of Maryland enlivened an off year politically by staging a hot election of its own, getting up an anti-administration ticket to be put in the field against the re-election of Dr.



H. M. Rowe as the president of the club. The "antis" based their opposition, according to the statement of their circular, on the existence of considerable disaffection between the club and the state authorities as a result of Dr. Rowe's attitude on the Adamson bill.

In Massachusetts car thieves adopted a most strenuous expedient to cover up their crime. After driving a stolen car into a wooded section a hole was dug and after the car had been driven into its specially prepared grave it was covered up with dirt. The fact that the windshield was left above the ground led to its discovery by some boys.

The Ford Motor company during the month of October produced 79,675 cars, making a total for the past six months of 469,135. Despite this heavy production, which is at the rate of over 900,000 cars a year, the company is still some 100,000 cars behind in orders.

Iowa now has one motor car for about every nine of its inhabitants, the registration to date in that state being over 277,000 cars.

Police graft investigations, so popular a few years ago, are such a decided rarity now that to find one popping up in Greater New York is some consolation to motorists who have suffered. Motorcycle cops in Central Park were doing nicely against the high cost of living, it is maintained, holding up motorists and taking bribe money to avoid summons. After repeated bleedings a number of



autoists have bared the practise to an extraordinary grand jury.

Some of the girls who have been driving the ambulances in the war zone have become very expert in both driving and making repairs. Many are capable of entirely disassembling and assembling their machines should it become necessary.

In Milwaukee, for motor car theft recently, a six-year sentence was imposed on a youth named Leo Wojcieshowski, which should give Woj ample time to read the war news from Russia.

Pacifists in America would be even more pacific if they could witness the results that follow the explosion of some of the large shells on the French front and would realize that Germany has challenged us to something besides a ping pong game. In one of the cities in Flanders, located amid the active operations, a large shell struck beneath a motor car and after penetrating the ground for several feet, exploded. A wide crater was made in the street, an adjacent house nearly wrecked and the motor car was found located on the edge of a roof, over 20 feet up in the air.

No, gentle reader, this isn't the Kiralfy troupe doing their famous acrobatic



act, nor the magic cabinet act of Black Crook and other extravaganzas of those happy days back in the other century. It represents an automobile party at 1 a. m. ramming a freight between Holley and Albion, somewhere in the United States. Several couplings were broken and one more Liberty bond was put in circulation.

The Meridian Highway Association at its annual meeting recently voted to extend the road through Wisconsin and Michigan to Lake Superior.

-:::-The girls on motor row in Chicago gave a tobacco shower in honor of the soldiers and sailors on duty or waiting for orders to leave the training camps in this country. Less than a month ago they organized the American Business Girls' Patriotic League. They now have to their credit more than 700 members in Chicago alone, besides several shipments of "smokes" for the American fighters in France. The organization is not confined to Chicago. Applications for membership flooded in from East, West and South, and the expectation is that the league will soon be national in scope. At their first tobacco shower hundreds of smoking kits of cigars, cigarettes, pipes and "the makin's" were brought to the Hotel Metropole.

Several suggestions have been offered, toward the establishment of a "Carless Day" as a means of diverting a million barrels or so more of gasoline to the Allies now and then. If it comes to that



there are some so attached to wheeling that they just won't walk anyhow.

No patriotic citizen in this land would choose to have our army face the Kaiser's fighting machine single-handed just for the lack of a little help on the food saving campaign. It is necessary that the Allies be fed to uphold their stamina. With a normal consumption at home we will have 77,500,000 bushels of wheat to send abroad this year. We actually need 400,000,000 bushels for export. Some of this difference must be saved by denials and wheatless days. We normally have no sugar for export. This year we must find 100,000 tons before Jan. 1. If every person will save a teaspoonful of sugar at each meal there will be plenty of surplus sugar for export.

Automobile manufacturers don't guarantee their cars when they are stored on the bottom of the ocean for several months, but notwithstanding this fact a purchaser was found for a King Eight touring car after it had undergone such an experience. The car was part of a shipment in transit to Russia via Vladivostock aboard a boat that was shipwrecked on the Chinese coast. The car was salvaged from the ship after it had been under the water for three months and was sold at auction to an English merchant at Hongkong. He overhauled the machine and it ran perfectly on the first trial.

Mr. McChesney gets exceedingly lonesome in a tank town, as any traveling salesman will tell you. One of them moored in a place on the Connecticut circuit a few evenings since hit on a rather

-:::--



unusual idea to break the speil. He dropped in at the police station, coaxed the chief into giving him rides around town in the motor patrol and imagined it was Saturday night.







The AUTOMOBILE JOURNAL

Is the oldest Automobile magazine published in America devoted wholly to the owners of pleasure cars.

A quality magazine with prestige and circulation that brings results to advertisers.

TIMES BUILDING PAWTUCKET, R. I.

HEINZE





It is a well-known fact that Paige Dealers are among the biggest money makers in the motor car field. An inspec-

tion of the Paige line will explain why

PAIGE-DETROIT MOTOR CAR CO.,

Detroit, Mich.

\$2.00 THE YEAR
The Accessory and Garage Journal

The National Trade Authority

TIMES BUILDING, PAWTUCKET, R. I.

tween the carburetor and manifold, and between the manifold and engine, also around the valve stem bushings. If the engine action is changed it is a sign of leakage, which should be remedied.

Valve guides should be replaced if leakage is evident. In replacing gaskets at intake manifold the old gaskets should be removed and the faces of both the manifold and block should be scraped clean with a chisel or sharp knife. The new gasket should be coated with shellac and the parts replaced and tightened before the shellac has had a chance to dry.

Other gaskets on the intake line should be treated in the same way. Gaskets for both purposes may be obtained from the supply house cheaper than they can be made by the repair man.

COMPRESSION LEAKS.

(C. A. DuBois, Waltham, Mass.)
Second Best Letter.

To locate compression leaks, first place lubricating oil around the spark plugs, pet cocks and valve covers and turn the engine over slowly by hand. Wherever bubbles show in the oil leaks are indicated. Engines fitted with detachable heads should be tested around the joint where the head i. fitted to the block.

When leaks are located the joints should be tightened and if this does not remedy matters, new parts should be substituted, the gaskets being covered with shellac.

Next remove each spark plug consecutively and put in its place a compression gauge, which will indicate compression in cylinder when engine is turned by hand. This compression should be at least 40 pounds per square inch, and averages between 40 and 60 pounds. A compression gauge can be made by soldering a tire valve gauge into a discarded spark plug shell.

Another method of testing for compression, though not so accurate, is by comparison. Turn the engine over by hand and compare the relative amount of power needed to compress the gas in each cylinder. Weak cylinders will be easily located in this way.

Copper asbestos gaskets liberally coated with shellac may be used for the joint between the manifold and cylinder block, while paper gaskets may be used for the joint between the carburetor and manifold.

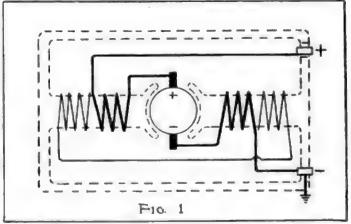
The joints should be made up while the shellac is still damp, or tacky, and after the joint has been made it should be covered with shellac. The engine should not be started until the shellac has had time to dry.

AUTO-LITE GENERATOR TROUBLE.

(R. C. M., Greenfield, O.)

I have an Overland car, model 75B, equipped with an Auto-Lite generator. This generator does not seem to give any current. Will you kindly tell me how I can test out the colls and armature?

The Auto-Lite generator is of the reverse series type, two pole, and has two outside connections marked plus and



Auto-Lite Generator Wiring. Taken from American Bureau of Engineering Wiring Diagrams.

(When Writing to Advertisers, Please Mention The Automobile Journal.)



tered gasoline passes through B to the carburetor. From time to time the petcock in the bottom of the device may be opened and the sediment drained.

Though your trouble may be due to the above mentioned carburetor water, or dirt, lock, it is probable that there is some fault in the ignition line. Since you say that the trouble is not eliminated when batteries are used, it would seem that there might be a break in the coil box. Starting at the two connections or porcelain terminals where the battery and magneto wires are fastened, follow the circuit through to the inside of the box. Make a very careful examination of the switch and the connections. It is very possible that the jar of the car in running breaks the switch connection at times. The centre or switch bar is connected with a bus bar upon which rest the four coil units. Be sure that this wire is not broken and that the units are not so loose in the box as to allow them to jar away from the bar.

If the trouble is in the coil box you may be able to locate it by shaking or pounding the box while the engine is running. If the engine action is disturbed when this is done you may be sure that the trouble is located either in the box or in the connections to it.

STORAGE BATTERY CONNECTIONS.

(R. W. J., Havana, Cuba.)

Will you kindly let me know why a single cell of a lead battery will register 3.7 volts when the battery is supposed to be discharged?

Why do some cars come from the factory with batteries placed with positive poles connected with the ground. Should not the negative wire always be connected?

How is one to determine if battery is placed in oar in right or wrong direction since it will crank the car whichever way it may be connected?

We have never heard of an instance where a single cell of a storage battery registered as high as 3.7 volts. The maximum reading obtained at the peak of charge is only about 2.6 volts, and this reading only continues during the time while the charging current is connected. Either you have made a reading of two cells or have a voltmeter which is out of order. We would suggest that you take a reading of the specific gravity of the electrolyte and compare it with the readings taken from the other cells. The three readings should be the same.

In a fully charged battery the electrolyte has a specific gravity of from 1.275 to 1.300. If this reading varies from that of the other cells as the discharge goes on it is an indication of a faulty cell.

Should it happen that one of the cells became damaged the reading of the battery would be materially altered, and the faulty cell would be indicated by its low voltage reading or low specific gravity.

There is no set rule for the grounding of the negative battery pole and this connection is purely a matter of design. Some systems ground the negative, others the positive pole of the battery.

Internal generator construction is the deciding factor and the essential point is that the positive battery and generator terminals, as well as the negative battery and generator terminals be connected. This connection being made, of course, through regulating devices, cut outs, etc.

If the car is fitted with an ammeter which shows charge and discharge readings the correct battery connections may be quickly determined by turning on the lights and connecting the battery to the lead wires. If the ammeter reads "discharge" the battery is properly connected. If it reads "charge" the wires should be reversed.

If the car is not fitted with an ammeter the two lead wires which normally are connected with the battery may be dipped into a solution of salt and water, about a tablespoonful of salt to a cup of water. Upon starting the engine (which should be run at a speed corresponding to a car speed of about 15 miles per hour), a great number of bubbles will rise from the negative wire, while the positive wire will have but few bubbles. The negative wire should be connected with the negative battery terminal.



10° below in Alaska—or 100° above in Texas—it's all the same to Non-Fluid Oil. Its consistency cannot change.

Remember this fact, when you next need to refill your transmission and differential. Then you'll buy Non-Fluid Oil because it will work as well in January as in August.



Most common greases are hang-overs from the day before motor cars. They won't lubricate until heat melts them. They leak out when melted. They contain body-giving impurities. They create triction,

Non-Fluid Oil was perfected to meet motor car conditions. It lubricates instantly. Contains no impurities; lasts longer and kills friction better than any common grease.

Give it one trial and you'll know the difference. "K-oo," Special" grade is for gears; "K-ooo" grade for bearings. Seld only in orange-colored cans at your dealer's.

N :w York & New Jersey Lubricant Co., 165 Broadway







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Harvey to the Rescue

A broken spring—a frenzied customer calling for help—demanding a new spring "rush"! It's an odd size; you have none in stock to match it!

And yet, you realize the importance of giving this customer real service, not particularly for the profit in this one job alone, nor even for the trade of this one customer, but because service at a time like this will bring the word-o'-mouth publicity which follows naturally when a customer is pleased.

So you call



to the rescue. There's a Harvey Jobber near you, you get him on long distance, in a few words tell him your needs, and then turn to your customer with the satisfied feeling of work well done, because you know that already the exact spring you want and the best spring money can buy is speeding to you.

"That's service"! says the customer. And when his car is on the road again he tells his friends about it and they say with him, "That's service"!

That is Service, Harvey Service, and it's always ready to help you build a business that will be respected far and near. They may forget the name of the spring you used but the memory of the service you have given will never be lost.

There's A Harvey Jobber Near You

Drop us a card and we will send you his name and our Spring Book giving complete weights, styles, measurements and prices of over 900 different kinds of springs. Write today —you may need Harvey Help tomorrow.

Harvey Spring & Forging Co. 915 17th St., Racine, Wis.

TROUBLE WITH DELCO SYSTEM. (J. A., Brooklyn, N. Y.)

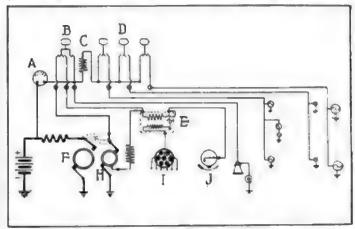
I am having some trouble with the Delco system on my Buick model E-8-45 car. The battery will not remain charged and I am obliged to carry it to the service station quite frequently. It seems to me that there might be a ground connection somewhere in the system because with no lights on and the engine running the ammeter indicates charge. What do you think about it?

If there is a ground or short circuit in the system it will be an easy matter for you to locate it by following the directions given herewith and referring to the accompanying wiring diagram. First make a test outfit by obtaining a light socket and placing in it one of the headlight bulbs. The two terminal wires from the socket we will term hereafter as test points.

First Test. With all switches off disconnect the positive battery wire from the battery and touch one test point to the wire and the other to the battery terminal.

If bulb glows or lights disconnect the wire from the ammeter. If bulb goes out when this is done indications are that the ground is on the other side of ammeter.

If bulb still remains lighted disconnect the heavy wire leading from the battery to the motor at the motor end. If light goes out trouble is in the motor and we would advise you to have a repair man make an examination of this unit.



Delco-Buick Wiring on Model E-6-45. A, Ammeter; B, Ignition Switch; C, Cut-Out; D, Lighting Switches; E, Ignition Coil; F, Motor; H, Generator; I, Distributor; J, Breaker Box.

If light still remains lighted it is an indication of a ground between either the battery and ammeter or between the battery and motor.

If light glows in first test and indicates trouble on the other side of ammeter, the grounded circuit is probably in the horn wire. To be sure of this disconnect it at the switch (3) and watch light bulb, if the light goes out, supposition is correct, otherwise make careful examination of switch connections and be sure that all connections are made as in diagram. Be sure that all lint, dirt, dust, etc., is removed from switch terminals.

Second Test. If light does not burn in first test proceed as follows: Try each lighting switch in succession, in every case built will glow, but if it burns at full candle power, ground connection is in lighting circuit controlled by that switch which causes built to burn full candle power.

Third Test. If trouble is not located in any of the previous tests, with lamp connected as in first test and all lights off, pull out switch B (ignition), light will probably burn. Disconnect wire No. 2 at generator and wire No. 4 at ignition coil. If light continues to burn ground is in one of these wires. Disconnect each in turn at the switch to locate trouble.

Restore all connections and remove test lamp. Pull out ignition switch and note whether generator motor shaft revolves, if it does not the unit is at fault and a repair man should be consulted. If it does revolve the starter works

properly, and the ignition unit functions the battery charging trouble is due to low charging current. If this is the case we would advise you to consult a repair man familiar with generator troubles.

MAXWELL AND FORD QUERIES.

(G. W., Cohasset, Mass.)

My Maxwell model i, 1911, will not run over five minutes and when it stops I can hardly turn the engine over by hand. In fact, it is difficult to crank it at any time unless the pet cocks are opened. Can you tell me a possible reason for this?

Would it be practical to take current for lighting tail and head lights from the magneto of my Ford car, year 1913?

(The Maxwell car spoken of is probably a Maxwell-Briscoe.—Ed.)

It is evident that there is considerable internal friction in your Maxwell engine, probably in one or more of the cylinders, due to oversize pistons or rings. That the friction increases with the heat shows the trouble to be in the pistons rather than the bearings. We would suggest that you remove each of the pistons and measure them.

The clearance at the top of the piston should be .004 and the clearance at the bottom should be .0025. By the clearance is meant the difference between the piston diameter and cylinder diameter. Since the lowest part or skirt of the piston is not subject to as much heat as the upper part, the clearance need not be as great.

Be sure that the cylinders are not worn out of round or egg shaped. We have heard of cases where new pistons were fitted to cylinders out of round, the measurements being taken on the longest diameter so that when the piston was in place the fit was too close.

A careful examination should be made of the rings. Be sure that the rings do not bind in the piston grooves and that a slight clearance is left between the ends of the rings when they are in place. This distance should be about .008 on the lower ring and .015 on the upper. If this space is not left the ring will bind and cause trouble as soon as it is heated.

We doubt if you will be able to get satisfactory results from your Ford magneto if you use it for lighting. This magneto was somewhat smaller than the one in use on the 1917 cars and was designed for ignition only. When used for both ignition and lighting it is put to a severe strain and depreciates very rapidly.

We would suggest that you use a storage battery or acetylene tank for lighting and keep all of the magneto current for ignition.

MARMON PRICES WILL BE ADVANCED ON DEC. 1.

The Nordyke & Marmon Co., Indianapolis, Ind., makers of the Marmon car, have announced an increase in price, which will become effective on Dec. 1. The Marmon sedan after that date will sell at \$5000, the landaulet at \$4650, limousine at \$4550 and the open cars at \$3550.

PRICE OF COLE CARS TO BE ADVANCED ON JAN. 1.

The Cole Motor Car Co., Indianapolis, Ind., has announced that two new sport models will be brought out early in the new year, a four-passenger and seven-passenger type. Prices of all Cole models will be advanced \$200 on the first of the year.

GENERAL ENGINE REPAIRS. (Continued from Page 38.)

There are many things which effect the cooling system which must be kept, as above stated, between 170 and 190 degrees. Deposits of alkaline substance, scale or dirt retard the circulation, retain heat and upset the system generally.

Cleaning in General Overhaul.

In making a general overhaul of the engine the cooling system should be given an application of cleaning compound, such as potash, lye or washing soda, or both. A strong solution is mixed and after being carefully strained through cloth



"NORMA" BALL BEARINGS

(Patented)

Silent, smooth, dependable service demands ample power at all times available and a lighting system at all times dependable. Dissatisfaction with many a good car and truck can be traced to defective performance on the part of ignition and lighting apparatus.

The service capacity of a magneto or lighting generator depends upon the service capacity of its parts. The highest-grade magnetos and generators are safe-guarded against bearing troubles by the use of "NORMA" Ball Bearings—the speed bearings of proved serviceability.

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1917 SALES

FOREIGN BUSINESS \$90,958,243.00

From National Automobile Chamber of Commerce,
7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Per Cent. Decrease in Shipments to Great Britain, France and Russia During Last Fiscal Year—Big Increases to All Other Countries—Shipments Total 80,811 Cars, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less—Fewer Trucks and More Passenger Cars.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917, the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analyzing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased shipments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe.

Exports of commercial vehicles and passenger cars during the two years were as follows:

1916 1917
No. Value No. Value

Commercial.... 21,265 \$56,805,548 15,977 \$42,337,315

Passenger..... 56,234 40,660,263 64,834 48,620,928

Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14.468, 233 less, the shipments of passenger cars increased by 8600 and their value by \$7,960,665.

Great Britain and France were still our largest markets, despite their heavy falling off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all trucks and amounted to \$14,691,460, as compared with \$19,137,904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries, Holland and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries, Canada is America's best customer for motor cars, having increased her purchases by nearly \$4,200,000—from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647—an increase of \$1,248,735 over the year before.

The most remarkable increases, however, are shown by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took automobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States e norted in the last fiscal year 23,435 automobile engil s, valued at \$2,844,406; tires worth \$12,330,201 and parts worth \$27,284,932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

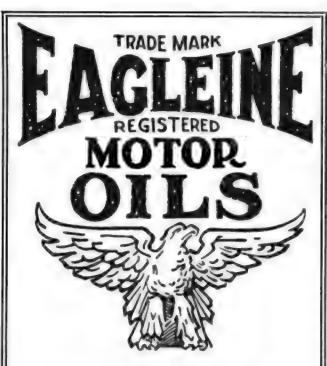
If you are a member of the Foreign Trade Bureau conducted by the Automobile Journal Publishing Company you can reach 8,000 foreign buyers of pleasure cars, tracks, first supplies, accessories, tools and equipment in more than 81 foreign countries.

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are unequalled for motor lubrication, freer from carbon, economical because they protect the motor against mechanical wear, and the quantity required is comparatively small.

These are the claims of thousands of motorists,—some with years of experience, who want full value, and more who know the value of high grade lubricants, and who know when they obtain satisfaction.

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1916 Davis Touring Car in excellent condition......\$450.00 1916 Dodge Roadster, for all practical purposes, as good as new\$400.00 1916 Oldsmobile eight-cylinder Touring Car, has had very little uso\$700.00 1915 Little Six. Chalmers Touring Car, in A-1 condition throughout\$500.00 1916 eight-cylinder Abbott-Detroit, seven-passenger; original price \$2200.....\$650.00 1916 Ford Touring Car, good condition throughout.....\$225.00 Get in Touch With Us At Once.

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Buy a LYDON SPEEDLER. Increase mileage from 25% to 40%. Get more power and freedom from carbon. Have an air brake on your car and a cooler engine. Put on a

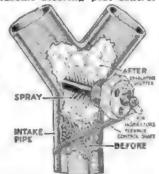
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We have them for 100 Different Models 5ave 50 to 75 Per Cent.

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Auto Owners Why Overpay?

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Cylinder Regrinding Pistons, Rings,

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All Makes, Slightly Used.

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We repair Radiators in most any condition, also Lamps, Windshields and Fenders of every make and in any condition. Largest repair plant in New York. Great accessory bargains on York. Great accessory bargains on hand for immediate delivery.

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Eight Day Rim Wind and Set Regular \$12.50

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SHOW ISSUES

SHOW AND SPECIAL **ISSUES**

Application for Membership in Audit Bureau of Circulations



National Authority on Highway Haulage

December, 1917

Annual Dealers' Number

January, 1918

Specification Number

February, 1918

Boston Show Number 4 GREAT NUMBERS 4

Application for Membership in Audit Bureau of Circulations



ALL TRADE SHOW EDITIONS

December 25, 1917 Advance New York Show Number

January 20, 1918

Advance Chicago Show Number

February 25, 1918

Advance Boston Show Number

March 25, 1918

Trade Buyers Number

AUTOMOBILE JOURNAL PUBLISHING COMPANY PAWTUCKET, R. I. TIMES BUILDING.



THE annual New York Show Advance Number of the Automobile Journal, which will be the next issue of this magazine, will be presented for the first time in any publication complete specification data of cars that will be built in 1918. It will anticipate all the features of the big national exhibition which is to be held in the Palace Garden, Jan. 5 to 12, and present a foreview of 1918 production with a fullness of subject and detail fitting the widespread demand for lucid, accurate information on cars of 1918. All of these features will be copiously illustrated.

SPECIAL feature of the Show Number will be the constructional details of a high grade car. The mechanical staff has been at pains to make this special description a towering feature in the serial which has been running for six months. With many selected illustrations this feature in itself will be an outstanding, practical contribution to periodical literature on the used car which no publication in the land can match. Features of body design, details of new cars and strong mechanical discussions will round out and make complete this remarkable periodical. All will be handsomely fliustrated with half tones and special drawings.

WHAT a romance there is in the mechanical development of all vehicles since the gasoline car began its career. The motor car and its offspring, its brothers, sisters and cousins, and all the mechanical kin of the internal combustion engine are to be featured popularly. Show fashions and motoring costumes of the very latest mode are shown in the fashion feature section, which will contain valuable hints for all motoring occasions and a surprise for the dressiest.

VOL. LXIV. DEC. 10, 1917. NO. 9. ren Glare Headlight Elimination..... 7 How Law Enforcements Would Minimize Dangers. Overhauling the Automobile....11 Description of Methods for the Packard Twin Sixes. Industry's Meaning to War.....14 Motoring Modes for Winter.....17 By Mrs. A. Sherman Hitchcock. Marking Cars Against Theft.....19 Garages—Plate XIV......20 Combination of Garage the Service Station. Advertising the Trade Mark.....22 By L. W. Mida. National Automobile Association..23 National Highways...........26 Accessories Department......27 Road Conditions in the South.....30 By F. H. La Baume. New Pilot Model......31 Winter Business Aids......32 Graphic Items......33 General News of the Industry....36 Scientific Fuel Saving......40 Queries41 Advertisers' Index..... 2 -:::-Treasurer . . WILLIAM H. BLACK Secretary . . , D. O. BLACK, JR. Published the 10th and 25th of each month by the AUTOMOBILE JOURNAL PUB. CO. Times Building, Pawtucket, R. I.

FACT not to be overlooked is that the current journal is most meritorious in content, context and illustration. Besides a story on lighting of supreme importance to every driver and rider, the fuel subject and the protection of cars against theft are exhaustively treated. In the news sections of the National Automobile Assoclation important new traffic laws and legal decisions are fully noted and clearly explained. The mechanical construction of the Packard is presented in this issue by the mechanical staff of the Automobile Journal for the benefit of the practical mechanic and owner to whom the overhaul of this great car is a matter of prime importance. The article is one of the series on the overhauling of used cars and is a notable addition to its popular and illuminating predecessors.

CONSTRUCTIONAL features of the 1918 passenger cars will be given special emphasis in the show number and issues following. Careful and accurate text is supplemented throughout by a wealth of illustrations from photographs and diagrammatic sketches which will make the issue by far the most elaborate and distinctive of its class. Description of seasonable and all-year round bodies, lighting and starting systems, accessories, parts, fittings and supplies, invaluable to car owners, dealers in new and used cars and repairers, make up scores of freely and selectively illustrated pages. While the magazine will be on sale at the show it is best to order advance copies early. At no previous time has there been such a wealth of material and motoring information offered to the public in any publication specializing, in passenger cars and the interests of their owners and distributors. Don't miss getting the New York advance show number.







and either absorb or refract the light rays. The Fracto lens, made by the Crew-Levick Co. of Philadelphia, Pa., is of this type and consists of a heavy glass half cone, which is attached to the lower part of the globe. By means of ribs the light rays are refracted and cover a fan shaped area in the road ahead.

J. H. Faw, Inc., 41 Warren street, New York, market a device called the Lennon light protector. This device is made of one piece of polished nickel plated spring brass and fits on the under side of the light bulb. By reflecting the light to the upper part of the parabolic reflector all direct beams are thrown down upon the road.

The Perrin Manufacturing Co. of Ptroit, Mich., sell an aluminum device which clamps on the under side of the bulb and prevents direct rays from being projected upward.

A well known device for cutting off and controlling the upward light rays is known as the Lawco deflector, made by the F. H. Lawson Co. of Cincinnati, O This device consists of a visor like arrangement placed in front of the headlight and interrupts all but longitudinal light beams.

The Glare-Off, made by the Glare-Off Co., Broadway, New York, is a device which may be attached to the regular lens and is designed to cut off certain light rays, both at the centre, where the bulb is located, and at the upper outside edges of the lens.

Representations of Another Type.

A device of the fourth type is represented by the Pennock headlight tilter. When this device, which is made by the Specialty Manufacturing Co., Minerva, O., is in use, both headlights may be tilted by the pressure of the foot upon a pedal located in the car, thus cutting off all but the necessary light upon the road.

The A-B auto eyes, made by the Adams-Bagnali Electric Co. of Cleveland, O., are unique in that the light tilting arrangement is electrically operated. Pressure upon a button, conveniently located within the car, causes a motor in one of the lights to operate and the lights are tipped forward. Continued pressure brings the lights back to normal position.

Additional Devices.

Among other makers of headlight lenses, hoods, globe devices, etc., are the Letts Deflector, Manifold following: Heater Co., Cortland, N. Y.; Rand Reflector, Rand Mfg. Co., Haverhill, Mass.; Glare Screen, Palmer Glare Screen Co., Cleveland, O.; Offset Reflector, C. T. Sutterley & Co., Philadelphia, Pa.; Stryker Reflector, C. L. Stryker, Buffalo, N. Y .: Ames Reflector, Heinze Electrical Co., Lowell, Mass.; No Glare On, No-Glare-On Co., Watertown, N. Y.; Da-Lite, Jeanette Toy and Novelty Co., Jeanette, Pa.; Primolite, Standard Glass Specialty Co., Morgantown, W. Va.; Mac-Kno Bulb, F. F. MacLean Co., Syracuse, N. Y.; Perrin

No-Glare, Perrin Manufacturing Co., Detroit, Mich.; Omolite, Omolite Co., Jamestown, N. Y.; Holophane, Holophane Glass Co., New York; Crockell, C. W. and C. H. Crockett, Troy, N. Y.; Rite Ray, Reflex Co., Newark, N. J.; Consolidated Sales Co., Milwaukee, Wis.; Full Ray, Purfex Manufacturing Co., Philadelphia, Pa.; O-U-Lite Dimmer, O-U-Lite Co., Racine, Wis.

With so many types of devices ava able the motorist has no excuse for breaking the law, assuming risks or causing undue annoyance to other motorists who have as much right to the road as he has.

JOHNSON GOES TO HYATT.

A. R. Johnson, formerly assistant advertising manager of the Cadillac Motor Car Co. of Detroit, has been appointed assistant advertising manager of the Hyatt Roller Bearing Co. He will be associated with W. E. Biggers, advertising manager, in the work of advertising and sales promotion. Before he became interested in the motor car industry Mr. Johnson was engaged in service and promotion work on the Chicago Tribune, in charge of advertising of the Hartmann Trunk Co. of Racine, Wis., and manager of local and foreign promotion on the Milwaukee Sentinel.

CARS PROVE THEIR ESSENTIALITY

Newer Arm of Transportation System Important Factor in Winning the War Says John N. Willys

HAVE you considered what a big part the automobile is playing in the winning of the war?" says J. N. Willys, president of the Willys-Overland Co.

"I wonder how many realize that the automobile is as much a part of our vast transportation system as the trains and tracks themselves?

"Did you ever stop to think what happens to men and material after the railroad delivers them to the station? Do you realize that tremendous gain in speed we have achieved in moving men and materials by means of the automobile?

"Of equal value is the intricate use of the automobile made by the American business man. If you walk down the streets of any town or city you'll find the curb lined with automobiles. Every car there represents some one on an errand, and every car there means an hour or two added to its owner's useful day.

"Probably no factor in all of our business machinery is more vital to our success than the automobile. The four million automobiles in this country are traveling millions of miles every day, and every mile they travel is saving time and energy and money.

"In this war, as never before, we are brought to a realization of the overwhelming importance of this newer arm of our transportation system."

INVESTIGATING ROUTES FOR TRUCK TRAINS TO EAST.

A party representing the Engineering Corps of the United States Army and the Office of Public Roads recently left Detroit in the official car of the Lincoln Highway Association for the purpose of making a first hand inspection of the through routes of motor travel from Detroit and middle west points to Atlantic coast ports. The car was driven by H. C. Ostermann, field secretary of the association.

After the choice of a definite route to an Atlantic port a practical test trip by an army truck train will be tried out, according to Roy D. Chapin, chairman of the Committee on Highway Transportation of the Council of National Defense and vice president of the Lincoln Highway Association. If this experimental trip proves successful it is planned to drive the army trucks over the route on their way from the factories to points of shipment.

MINING ENGINEER INVENTS NEW CARBURETING DEVICE.

Charles A. Couch, a mining engineer of Worcester, Mass., has announced the invention of a new carbureting device, which it is claimed will save from five to 30 per cent. of gas, as well as increase the efficiency of the fuel from 10 to 25-per cent.

His device is called a turbine mixer. It imparts a whirling or churning motion to the fuel, keeping the air and gas thoroughly mixed as it passes into the inlet manifold. Following tests of the device on light and other cars the inventor took the matter of the invention up with the government.

ACETYLENE STATIONS NAMED.

The Prest-O-Lite Co., Inc., Indianapolis, Ind., has announced the appointment of the following acetylene distributors: J. T. J. Graves Co., Salem, Ind.; Wheeler-Elam Co., 212-216 N. Main street, Valparaiso, Ind.; John and Ira Green, 21 Water street, Pontiac, Mich.: S. Bemrod Auto and Supply Co., 712 Eighth street, Wichlta Falls, Tex.: Repass Auto Co., 217-225 W. Fifth street, Waterloo, Ia.; Maxfield Motor Car Co., Inc., Winsted, Conn.; Maxfield Motor Car Co., Inc.: Torrington, Conn.; Auto-Supply Co., Estherville, Ja.; Leaman-Pickford Auto Co., 27-29 Second S. E., Mason City; Lechner-Berg Service Station, 215 Walnut street, Muscatine, Ia.; Raymond & Haase, Shenandoah, Ia.; William Warnock Co., 607-611 Douglas: street, Sioux City, Ia.; Washington Service Station Co., 110 W. Second street, Washington, Ia.



What Motor Car Industry Means to the WAR

National Automobile Chamber of Commerce Shows the Mobile and Manufacturing Services Supplied and That Can be Supplied

FOLLOWING the offer of automobile manufacturers to serve the government in any way, a survey of the industry has been made by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, to show the kinds of service the motor car is supplying and can supply in the present national crisis. Washington officials are realizing more and more that the present war is dependent upon the motor car industry in as many and possibly in more ways than upon any other industry in this country.

Armies at the front and in the training camps are supplied with food, clothing, ammunition and all other necessaries by motor trucks. The armies in Europe are already using 100,000 motor trucks in transportation service. The United States army expects to call for 100,000 trucks for the coming year.

Cars on the Battlefields.

Many thousand motor ambulances are used for removing the wounded from the battlefields.

Paris was saved from invasion by rushing an army of 100,000 French troops in motor cars, omnibuses and taxicabs from behind Paris for the battle of the Marne. Verdun was saved by hurrying up ammunition and supplies in motor trucks when no other transportation would suffice.

British "tanks" made the break in the German line that resulted in the victory at Cambrai. These tanks are caterpillar motor tractors, a type of farm tractor developed in America.

Motor tractors are used for hauling heavy guns.

Armored motor cars have been used with success against rifle and machine gun fire.

Special Cars in Army Work.

Many types of special motor cars are used in army work. They include cars and trucks equipped with wireless apparatus, motor searchlights, motor kitchens, motors mounting anti aircraft guns, motor driven emergency hospitals, motor trucks for creeting telephone and telegraph lines, etc.

Motorcycles are employed almost altogether in the war for dispatch carrying

American automobile engineers and factories also developed the standardized motor, which will be built by tens of thousands in American automobile factories next year by the standardized quantity productive methods developed in this industry. It is believed these airplanes will materially help to win the

American automobile engineers and factories also developed the standardized

The statements of the National Automobile Chamber of Commerce, the great central authority of the motor trade, can be depended upon as authentic and reliable. The progress that has already been made in mobilization of the nation's mobile resources are accurately told in the bulletin issued Dec. 5 by this organization, While it is in the main a review of the items which have been run currently with their happenings in the columns of the Automobile Journal, this review of what the motor industry is doing in war services has the added value of pointing out what it can do and a fair estimation of the reserve powers of private motorists. The survey bulletin is herewith printed in full .-Editor.

United States army motor trucks and will build many thousands during the coming year. It is only through the standardized production methods developed in the industry that it is possible to manufacture these army trucks in such large numbers and to have the parts in all of them interchangeable. This interchangeable feature will enormously reduce the number of replacement parts that the army will have to carry in stock at the repair depots.

Development of Airplane.

It was the automobile business that made the airplane possible. The automobile manufacturers encouraged the steel manufacturers to evolve special alloy steels that were extraordinarily strong and light and high speed tool steel for working these hard, tough metals.

The automobile industry also developed the high speed gasoline engine that has been adapted to airplane and motor boat work.

The use of motor trucks made it possible to construct the 16 national army cantonments in record time. They hauled most of the material used in erecting the buildings at these cantonments.

Manufacturing facilities of the motor car industry are sufficiently extensive to produce most of the materials required by the army with the exception of food stuffs. Leading motor car companies are already extensively engaged in manufacturing not only motor trucks, motor cars, ambulances and tractors, but are also producing on a large scale gun caissons and parts, recoil checks, mine anchors, shells, etc. It is entirely feasible for

them to make steel helmets, all sorts of forgings, stampings and castings, tents, wagon covers and innumerable other articles of metal, cloth and wood. The rubber tire companies have begun making gas masks and have been making fabric for airplanes and bailoons for some years.

Trucks Relieve Railroads.

In response to the call of the Railroads' War Board, motor trucks are rapidly coming to the relief of the railroads in their present critical state of congestion, to care for all short haul freight traffic in and around cities up to distances of 25 to 50 miles. This will enable the railroads to clear the tracks and particularly the terminals for through freight of utmost importance, such as coal, sugar, ore, iron and steel, grain, necessary food stuffs of all kinds, munitions and other army supplies and troops. Taking over of short haul work by motor trucks will release many locomotives, cars and train crews for long haul work.

Army trucks are going to be delivered from the factories where they are built to the seaboard for shipment abroad over the public roads under their own power. They will make the trip loaded with spare parts and supplies and will be manned by the army motor truck crews that will handle them on the other side. Thus they will avoid the use of many thousands of freight cars and hundreds of locomotives.

Officers, automobiles, ambulances and motorcycles for courier service and machine gun batteries can also be delivered by road if desired.

Resources in Private Cars.

Should any eventuality arise, such as the blockade of a railroad, to make it necessary, the thousands of soldiers at any of our camps or cantonments could be moved rapidly by a concentration of thousands of privately owned touring cars of our citizens, and their entire equipment could follow in private motor trucks.

The 4.000,000 automobiles and 400,000 motor trucks and delivery wagons in use in America are a tremendous resource. They are time saving and labor saving machinery that enables more work to be done in a given time by fewer men and horses. Man power is scarce and high priced and horses and mules have been shipped abroad for army use at the rate of half a million yearly since the war began. Motor cars are a necessity to the farmer and motor trucks are equally necessary to manufacturers and merchants who have found it imperative to bring materials long distances by truck and make long distance deliveries to avoid railroad freight embargoes and other rall delays.

OFFICIAL KEROSENE CARBURETOR

Government Announces Highly Economic Device for Motor Cars At Its Disposal for the War

A N ANNOUNCEMENT, startling in its nature and of great economic import at the present crisis, was made by the Interior Department at Washington in the form of a statement that the government had been offered the use of a new kerosene carburetor for the period of the war without charge.

The importance of the announcement, however, lies in the fact that the carburetor is evidently a successful one, which means that any doubt as to the sufficiency of the supply of engine fuels for war or domestic purposes is removed. There have been numerous announcements of kerosene carburetors. If successful their widespread use would be assured from the fact that an economy of from 50 to 75 per cent. would be effected in fuel costs. This latest announcement from the government seems to indicate that an efficient device has been invented for utilizing kerosene in internal combustion engines with the same facility as gasoline. No less authority than Van H. Manning, director of the Bureau of Mines, is said to be satisfied after investigation and trials of the device, that it will accomplish consistently everything that is claimed for it.

The inventor has applied for patents on his device and will turn the patent rights over to the government until after the war, but it is not known as yet whether the public generally will be allowed the benefits of the carburator until production for the government is completed and an ample supply obtained.

There are a number of kerosene carburetors on the market and many are being successfully used on tractors and other motor driven machines of the heavier type, but most of these devices have an auxiliary chamber device for starting the engine on gasoline.

NEW FORD STEEL PLANT A MILE IN LENGTH.

Henry Ford's great new steel plant on the River Rouge, near Detroit, is one of the largest structures of its kind in the world, if not the largest, being over a mile in length from one end to the other. Work is being rapidly pushed on the plant and it is expected that it will be in full operation early in 1920.

S. A. E. MEMBERS WILL DISCUSS LIBERTY MOTOR.

The new Liberty Motor that was developed by several engineers, members of the S. A. E., will be one of the leading subjects of discussion at the winter meeting of that organization in New York during the week of the National Automobile Show there. The principal

topic of this section, which will be, "The Reasons Back of the Liberty Engine," will be taken up in the afternoon program on Thursday, Jan. 10. Major Jesse G. Vincent, who is in charge of the aviation headquarters at Dayton, O., and who was one of the engineers who developed the motor, will be the first speaker, and will deal with the engineering questions involved in the creation of the Liberty engine. Col. Clark, in charge of aviation engineering in the Signal Corps, will open the discussion, which

will be carried on by Capt. Howard Marmon, who will discuss in a comparative way the engineering practises embodied in the Liberty engine as compared with those used abroad, where he recently spent several months.

H. M. Crane, engineer of the Simplex company, who has made extensive study of foreign aviation engines abroad, will also participate in the talk.

EDGAR APPERSON GENERAL MANAGER OF APPERSON BROS.

Edgar Apperson has succeeded his brother Elmer as general manager of the Apperson Bros. Automobile Co., Kokomo, Ind. Elmer Apperson retains the title of president of the company, but owing to ill health has been obliged to relinquish active duties.



SHOWS.

New York, automobile salon, Hotel Astor....Jan. 2-9 New York, 18th annual automobile show.....Jan. 5-12 Washington, D. C., carnival and open house week.....Jan. 11-18 Providence, R. I., automobile showJan. 11-19 Philadelphia, 17th annual automobile show......Jan. 11-19 Rochester, N. Y., 10th annual automobile show, Exposition Park. Jan. 14-19 Milwaukee, Wis., automobile show ... Montreal, Can., automobile showJan. 19-26 Cleveland, O., 17th annual automobile show......Jan. 19-27 Scranton, Pa., automobile show Jan. 21-26 York, Pa., automobile show...Jan. 21-26 Portland, Ore., automobile showJan. 21-26 Mifflintown, Pa., automobile showJan. 22-26 Allentown, Pa., automobile show.....Jan. 23-28 Bridgeton, N. J., automobile showJan. 26-Feb. 2 Chicago, III., national automobile showJan. 26-Feb. 2 Chicago, III., salon, Congress hotelJan. 26-Feb. 2 Harrisburg, Pa., automobile show....Jan. 26-Feb. 2 Manchester, N. H., academy Jan. 28-Feb. 2 Minneapolis, Minn., automobile show Kansas City, Mo., automobile show Kansas City, Mo., third annual tractor show......Feb. 11-16 St. Louis, Mo., automobile show Feb. 11-16 Newark, N. J., automobile show.....Feb. 16-23 San Francisco, second annual automobile show......Feb. 16-24

Waterbury, Conn., automobile show ... Des Moines, la., automobile show...Feb. 18-23 Syracuse, N. Y., automobile show. Grand Rapids, Mich., automobile show Springfield, O., automobile show.... Pittsfield, Mass., automobile show . . South Bethlehem, Pa., car and truck show......Feb. 18-27 Brooklyn, N. Y., motor vehicle show...Feb. 22-March 9 Omaha, Neb., automobile show.....Feb. 23-March 2 Bridgeport, Conn., automobile showFeb. 25-March 2 Boston, Mass., Boston Automobile Dealers' Association show......March 2-9 Trenton, N. J., automobile show..... Stockton, Cal., automobile show....April 9-13 Chicago, III., accessory show for Ford accessories......Sept. 23-28

MEETINGS.

New York, Automobile Electrical Association.....Jan. 3-4 New York, Society of Automotive Engineers, annual.....Jan. 9-10 New York, National Association of Accessory Jobbers.....Jan. 11-16 New York, National Automobile Dealers' Association (directors meeting). with vice presidents from eastern states...............................Jan. 7-8 New York, annual banquet Motor and Accessory Manufacturers, Waldorf-Astoria.....Jan. 9 Washington, D. C., carnival and open house week under auspices of Automobile Trade Association of Waahington.....Jan. 11-18



VIGOROUS ANTI-THEFT CAMPAIGN

Car Owners Everywhere Urged to Mark Cars and Help Check Cancerous Growth in Motordom

N THE old frontier days, when the vigilance committee made short shift of the horse thief by hanging him to the limb of a tree, stealing as a means of livelihood was precarious at the best and only the most desperate type of criminal persisted in this form of crime. With the automobile, however, conditions are far more attractive for the thief, as the penalty for stealing them is light and but a feeble effort is made in most cases to apprehend the culprit.

Most people carry theft insurance on their cars and when they are stolen they take only a half-hearted interest in their recovery, a condition which has encouraged auto thefts to the point where organized gangs in many parts of the country have been stealing automobiles by the hundreds. Concealing their identity is an easy matter and they find a ready sale. When apprehended the thieves in most cases get off with fines or comparatively light sentences, another fact which has encouraged the practise, so that it has gained alarming proportions.

Insurance companies who write automobile theft policies have already begun to take cognizance of the situation owing to the heavy losses sustained, and it is feared that if some drastic methods of stopping the wholesale traffic in stolen automobiles is not found, that theft insurance rates will become prohibitive. Taking steps toward ameliorating conditions, the Omaha Automobile Club, Omaha, Neb., has issued an appeal to automobile clubs throughout the country to urge their cooperation in a movement to secure more justice from the courts in the shape of more severe penalties for automobile thefts and also to stir the motor car owners from their apathetic attitude when their cars are stolen.

This appeal in part is as follows:

"Auto stealing has increased to present alarming proportions because of two basic facts: Unjustifiable elemency of the courts and apathy of the car owner in his own behalf.

"There are 4,000,000 automobiles in the United States. Even the non-owner admits the automobile a necessity.

"Fully 3,000,000 of the owners cannot afford to lose their cars. Their car is an investment, the same as their home. They use their car in daily business. Stealing a car stagnates business, robs the country's resources and the failure the land over to give the motorist justice due them in the courts is assuredly undermining that confidence the American public bestows in the American bar of fustice.

"A thief steals a \$2000 automobile, is caught and tried, facts sustained, yet in the majority of cases a weeping relative or the judge's refusal to realize that the automobile represents so much hard earned money is the cause of either

dismissal or that joke called paroled sentence. The same thief goes to the penitentiary if he steals \$2009 cash.

"A thief is a thief whether he steals cash or automobiles and if the cancerous growth of auto thefts is to be checked the sentence must be the same. There is no such person as a joy rider—he's a thief pure and simple, although on account of tender years clemency is rightly due here sometimes.

"The appalling number of car owners who recover their car and then refuse to prosecute are encouraging another theft. The average business thief knows he has a fifty-fifty chance to get off clear because of the car owner's apathy or the clemency of the courts.

cars has been adopted by a garage in Kansas City, Mo., Rahe's Locust Garage, and is being so utilized that it alsoproves effective advertising for the garage. This service is given to the motorist free. The proprietor invites anyone owning a motor car to bring it tothe garage, where a private number will be stamped on the car in different places so that it will be impossible to eradicate or disguise it and make it valueless as a means of identification. This number is known only to the superintendent of the garage and to the owner. Even if the thieves have cut the number from the engine and have repainted the car, it can be identified by the owner and the garage superintendent by its private numbers. A card is sent out to motorists, inviting them to avail themselves of the free offer made by the garage.

A proper and reliable identification mark on every car where it cannot be located by the thieves will go a long way toward discouraging the wholesale theft of cars, as many police depart-

WHAT TO DO IF YOUR CAR IS STOLEN. FIRST—Notify the Police Department. BOTH PHONES 9500.

Give them this information:

Your name		
Office is at	Phone	
Residence is	Phone	
My car is a 2-4-5-7 Passenger		
Car was taken from		
City License		
Body of car is painted	. Wheels	,
Top is made of		
Color of top inside is		
Engine Number is		
3.1		

Now give the police some description of your car which will distinguish it from the 20,000 cars in this district. Advise of some mark, like a torn top, scratch on body or fender, light broken, or some mark that will identify your car.

Fac-Simile of Service Blank Furnished M otorists by a Kansas City Garage in Anti-Car Theft Campaign.

"Another thing: Insurance companies will soon refuse to insure automobiles if present thefts continue to increase. Then you, Mr. Car Owner, will assume all the risk.

"This magazine is a link in a nation wide campaign for justice from both the American courts and the American motorist.

"We demand of the courts sentences in auto theft cases commensurate with the crime. The patience of 4,000,000 motorist voters is keyed to the breaking point. One just conviction is worth more than 50 arrests.

"We demand of the motorists full and zealous cooperation, even to the extent of each considering himself entrusted with the welfare of his brother motorists and to urge and encourage prosecution.

"Nearly \$4,000,000,000 invested in automobiles!

"Talk it up! Keep talking! Cooperate!"

The idea of tangible identification for

ments have been unable to obtain a conviction where they knew they were right, but could not give a positive identification, as the numbers and other means of identifying it had been removed.

NEW CHALMERS PRICE LIST.

A new Chalmers price list covering the 10 Chalmers models has been issued. The schedule, which does not include the war taxes, is as follows: Seven-passenger touring car, \$1535; five-passenger touring car, \$1485; duplex, \$1485; standard roadster, \$1485; touring sedan, \$1950; cabriolet, \$1775; town car, \$2925; limousine, \$2925; limousine landaulet, \$3025; town landaulet, \$3025.

PALATIAL HOME IN JERSEY.

William C. Durant, president of the General Motors Corporation, has purchased a pulatial home and estate known as Raymere, at Deal, on the Jersey coast.

PLATE XIV.

GARAGE AND SERVICE STATION 125 x 48 FEET

Structural Plan for Business Building Providing Ample Office, Work Room and Storage, Which May Be Erected Anywhere Reasonably

Designed by the Architectural Department of The Automobile Journal Publishing Co.

A S A BUSINESS proposition the combination garage and service station affords the owner a better and more sure means of profit than if he conducted either separately, as the business of furnishing service and housing for cars is so nearly identical one feeds business to the other line and vice versa.

A structure suitable for this business and one that would serve the purpose either in a small city or large one, is presented with sufficient detail to meet the requirements of anyone contemplating the crection of such a structure. It is of ample size to provide garage space for 30 odd cars and still leave sufficient room for overhauling and repair work, being 125 feet in length and 48 feet in width.

In the front of the building will be seen an office and storage room on either side of the entrance. An excavation about the same dimensions as the office, beneath that room, provides basement space sufficient for boiler room, coal storage, various meters and entrance for underground pipes, wires, etc.

Provision for these things should be made in casting the concrete walls of the cellar, which extend eight feet below the grade line and 15 inches above grade, forming an underpinning for the structure as part of the main foundation walls. The foundation walls should be at least 18 inches thick and extend four feet below grade. The concrete mixture for the foundation is composed of one part cement, two parts sand and five parts crushed stone or gravel. The three-inch drain pipes are to be connected with the sewers and all water or gas mains to be in place before the floor is made.

The floor over the boiler room consists of 12inch I beams with concrete slabs. The remainder of the floor is laid on well rolled or tamped cinders and should be four inches thick in two layers; one three inches thick of same mixture as concrete walls, and a coating of one inch made of one part cement and two parts sand.

Brick is used in the construction of the main walls of the super structure. The side walls are 12 inches thick and 16 inches thick where the truss rests. The trusses are placed 12 feet six inches on centres of 8x12 hard pine, as shown on the detail section of the plan. They rest on plates 12 by 18 by 5% inches. One and two-inch wrought iron rods are used in the construction

of the truss. The roofing unit is made up of two by seven-inch rafters, with seven-eighths inch matched board and three-ply roofing paper.

This form of roof support is essential in a well designed garage, as it eliminates the need of centre poles that would hamper ready manouvering of machines into position. As there is always a constant need of running machines from one position to another in a service station, the absence of any obstructions greatly increases the efficiency of a building for that business.

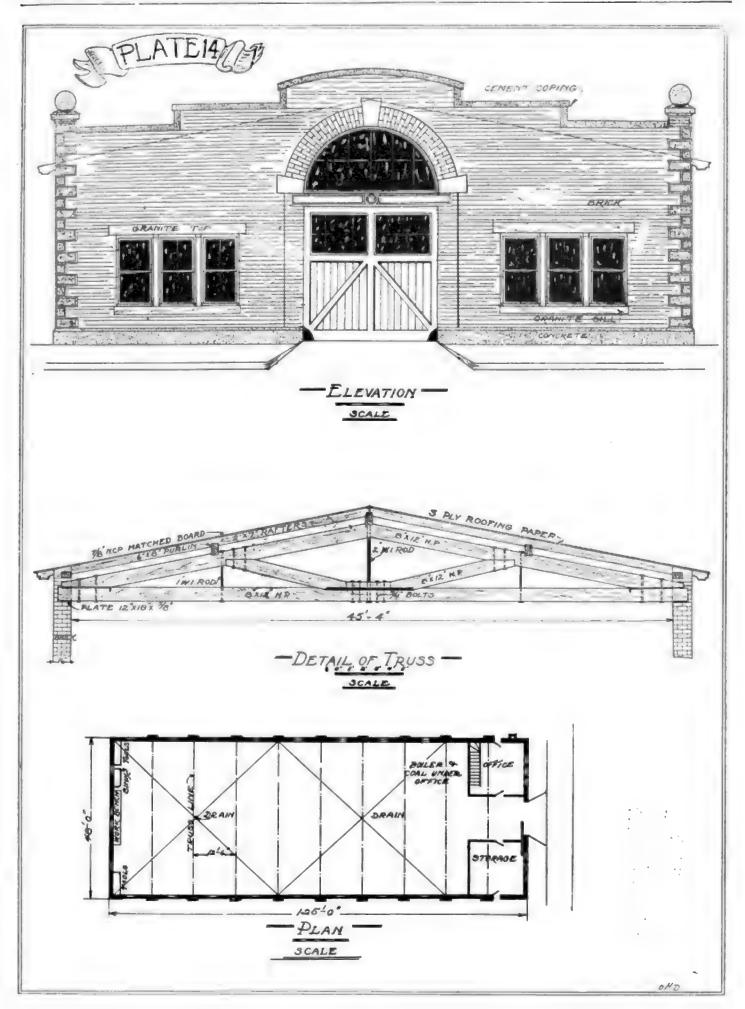
Spaces for the cars may be marked off on the floor by small cement bumpers about six inches high and curbed on the edges to prevent wear on tires. This idea is used in many of the largest garages where cars are constantly coming and going, to assist the operator to back into position with less trouble and eliminate the danger of collision with other cars, as once the rear wheels strike the guides they are obliged to follow the line of their outer edges back as far as the resting position. It also serves as a mark for the spaces so that there will be no argument about a driver occupying someone else's space or taking up more room than necessary.

The front elevation shows the arched door and window tops and sills of granite. A cement coping and ornamental caps provide for an exterior trim, removing all traces of severity of treatment. Ample entrance way is provided in the 10 foot doorway, equipped with a sliding door. A large window over the door surmounting a paneled wooden beam not only adds to the appearance of the entrance, but adds materially to the amplitude of light. Outside doors afford separate entrance to the office and to the storage quarters, in addition to the main entrance.

Plan details show the location of large windows to supply plenty of light. Options are retained to the individual for the layout of electric lights, a section for machinery and repair space.

In arranging for the heating system the owner should choose the kind of boiler adapted to his climate and coal supply, though, in general, in the distribution it would be necessary to use the wall pipe system.

Costs being subject to large fluctuations in choice and supply of materials might be expected to vary in this sizeable structure according to location and labor supply from \$6500 to \$10,000.







LADIES FIRST; CAREFUL DRIVERS

Women Car Operators Score Low Per Cent in the Massachusetts Survey of Accidents

OT alone in the political field is woman forging ahead. If reports indicate anything women are rapidly becoming the most careful of motor vehicle operators. Time was, and not so long ago either, when a woman operator of an automobile was regarded as a distinct menace upon the highway, but the Highway Commission of Massachusetts has gone a long way to show by an exhaustive investigation of all the facts connected with the more serious of motor vehicle accidents in the commonwealth during the last eight or nine years that the former public impression regarding women operators is untenable today.

Six investigators spent two weeks making a careful study of 675 selected cases of serious accidents, and compiled a report the results of which are published in the annual report of the commission for 1916. As a result the commission makes the following statements:

"The public has many erroneous ideas as to what causes automobile accidents.

The impression gets abroad that most of the accidents are caused by reckless or drunken operators running at excessive speeds, and that many operators are never caught. These impressions are not correct in fact in any large proportion of the accidents.

"Out of 675 cases examined the operators were believed to be intoxicated in 42 instances only, or in just about six per cent.

"Women are unusually careful operators, being involved in only four percent. of all the accidents, although they constitute about eight percent. of the licensed operators. They were held 'not at fault' in seven out of eight fatal accidents.

"In the 265 cases in which 243 pedestrians and 22 others were killed the pedestrian or other user of the highway was wholly at fault in 162 and partly to blame in 48. The operator was wholly at fault in 54 cases and partly to blame in 43.

"Two hundred and five deaths out of 625 would not have occurred if reasonable care had been exercised by the deceased. In more than half of all the cases in which pedestrians and other users of the highway outside of the motor vehicle were either killed or injured, the accident would not have occurred if the ordinary precaution had been taken of looking before crossing.

"In 433, or in nearly two-thirds of these cases, the motor vehicle was going at less than 18 miles an hour, and in 218 was going at less than 12 miles.

"In 1915 there was one fatal accident for every 381 registered motor vehicles, while in 1916 there was one fatal accident for every 468 motor vehicles registered. This certainly indicates more care and caution on the part of some one.

"The number of automobiles and trucks in Boston increased over 33 per cent. during the year, while the number of deaths caused by them only increased seven per cent. and the injuries only 15 per cent."

PEDESTRIANS IN HIGHWAY ACCIDENTS.

In some interesting statistics recently promulgated by the New York State Commissioner of Health at Albany, concerning the causes of highway accidents, he says the number of fatalities due to automobiles showed a marked increase and was greater than the combined deaths from typhoid and scarlet fever during September. The commissioner noted that there were less deaths from typhoid fever than the average for the same month in past years. These figures, he added, indicates the imperative need for the stringent enforcement of traffic regulations against reckless drivers, as well as pedestrians who are careless in streets and highways which they must share with vehicles. The commissioner apparently ignores the fact, however, that while automobile accidents increased the number of automobiles in use also increased, and the ratio of accidents to cars did not increase, and that the increase in the use of motor vehicles and the decrease in horses in the cities contributed materially to the decrease in typhoid and scarlet fever and other infectious diseases through reduction of the fly danger.

There is no city in the country which enforces the vehicular regulations more strictly and efficiently than does the city of New York, yet after years of study of this problem the police department of this city contains the following in its annual report for 1916.

"Should a law be passed giving the police some control of the movements of pedestrians, and should the enforcement of the law be supported by proper public sentiment, it is quite likely that not only will the increase in street accidents be checked, but that a decrease in the present number may be accomplished."

In Massachusetts, according to a recent report of the Highway Commission, the substance of which may be found in these columns under the heading "Ladles First," three-fifths of the highway accidents are caused by the carelessness of pedestrians. It is certain that there will be a considerable lessening in deaths and accidents if pedestrians will get into the habit before crossing streets and highways of recollecting the laconic wording of the signs posted at railroad grade crossings, "Stop, Look, Listen."

POLICE ACTIVITIES.

Boston. The police of this city, especially in the Dorchester, Brighton, Roxbury, Mattapan, Jamaica Plain and South Boston districts, are strictly enforcing the laws relative to the illumination of the rear number plates. The law, effective throughout the state, provides that lights shall be so placed that the rear register number shall be plainly visible at a distance of 60 feet.

Salem. The anti-dazzling headlight law is also being strictly enforced in Salem. Many arrests have already been made.

NEW JERSEY LAW MODIFIED.

Motor truck owners operating in New Jersey will be pleased to learn that the new act regulating the use of commercial motor vehicles, which was to go into effect Jan. 1, 1918, and which was regarded as over severe for motor trucks, has been modified by Commissioner Dill.

Under the new law the speeds were reduced to 12 and 10 miles per bour for three and five-ton trucks. This prohibition is removed and the present law left in effect.

Under the new law it would also be unlawful to carry more than two-thirds of the combined weight of vehicle and load upon the rear wheels. All existing equipment is now exempt from this provision, though it is not clear how it will affect new equipment after Jan, 1.

Study of the allowable weights to be carried on tires indicates, however, that with normal loading new trucks as at present designed will qualify under the section.

For example, a five-ton truck, loaded and weighing about 21,000 pounds, with a 40-inch diameter wheel, equipped with six-inch dual tires, can carry on each rear wheel 7562 pounds, or a total weight on both rear wheels of 15,124 pounds. The total allowable weight would then be 22,686 pounds, which is sufficient.

The allowable weight per inch of tire is increased 10 per cent., or to the weights shown in the following table, giving the gross wheel load in pounds:

Diameter of Wheel and Currying Capacity.

	Single	Inch	Tires.		
32	34	36	38	40	42
2 621	654	687	726	759	792
214 924	979	1034	1089	1144	1189
81237	1309	1375	1446	1512	1584
314 1556	1639	1721	1804	1846	1969
41859	1958	2062	2167	2271	2370
5 2576	2612	2750	2887	3025	3102
63096	2267	3427	1613	37F4	3954
73712	3921	4125	4384	4537	4745
	Double	Inch	Tires.		
21337	1207	1375	1443	1512	1582
214 1844	1952	2062	2172	2242	2392
32475	2612	2750	2887	2025	3162
314 3107	3272	3437	3602	3767	3932
43712	3916	4125	4334	4537	4741
54950	5235	5500	5775	6050	6325
66187	6534	6975	7221	7542	7949-
77425	7837	8250	8662	9075	9487

The section requiring governors on trucks is changed so as to exempt all present trucks.



Good Roads, Traffic Rules and Parking Places

RESOLUTIONS.

Whereas, it is essential that all transportation facilities of the nation should be brought to the highest state of efficiency in order that food stuffs may be moved most economically from the farm to the market, that manufactured products be moved at the lowest cost from the factory to the consumer.

Whereas, the public highways offer a good, prompt and economical means to supplement transportation by rail and water.

Therefore, be it resolved, that the prompt improvement of our public highways is important and should be forwarded in every proper way.

T THE recent convention of the Chamber of Commerce of the United States, held at Atlantic City, the accompanying resolutions which were adopted ought to attract the attention of the Federal authorities to the necessity of the immediate building of national highways to be used as military and post roads. The United States is the one great nation of the world which does not maintain a system of national highways. From time immemorial no governmental undertaking has proved of such material benefit to the peoples of a great country as have good and substantial highways; and nothing which the Federal government could undertake and complete would be so beneficial to the social, material and financial development of this great country as wound a great comprehensive system of highways for military and other national purposes.

THE following editorial in a recent iasue of the Fall River Herald conveys some sane suggestions upon the difficult problem of handling automobile traffic. It is evident that the time is not far distant when municipalities will have to set aside certain streets or places to be used as parking sites for motor vehicles in order to relieve the congestion in thickly settled and business thoroughfares. The before mentioned editorial, we believe, should commend itself to the serious consideration of municipal authorities.

"The abandonment of the project to provide a parking place for automobiles convenient to the centre of the city encourages the renewal of a demand for the enforcement of a traffic rule limiting the time when automobiles may be left unattended in certain of the business streets during business hours. The practise of leaving cars for a long time in places where they discommode other traffic is a nuisance of long duration in this city. Other cities do not tolerate it and it should not be tolerated here. People who want to pull up at the curbstone for the purpose of doing business in stores or offices nearby should not be forced out of their way because others have preempted the space and are holding it at their own convenience, sometimes half a day at a time. As has been remarked before, the business section where this nuisance now exists is not so extensive that a public parking place is necessary to relieve it. There are plenty of nearby side streets that can be used without causing general inconvenience, and the owners of automobiles should be required to move into them after a reasonable length of time that their cars have held one place on the busy thoroughfares. The inconvenience to them totals less than to the general public, which should have the first call on the use of the highways. The settlement of the parking place issue for a considerable time at least warrants the proper authorities taking up for consideration again some workable rules that will keep the business streets reasonably open during the middle of the day. Such a code of rules is in existence and has been made public, but has never been adopted. With certain modifications those rules, or others similar to them, should be put into force without further delay. Even on the approach of cold weather, when not so many automobiles are abroad as at this and the summer season, the conditions are sufficiently objectionable to call for a remedy; and a careful study of those conditions will conserve public convenience while it puts the owners of automobiles to no unreasonable inconvenience."

Woburn, Mass., Traffic Rules.

Woburn. Automobile operators and owners have been given a shock in Woburn during the past few days by the activities of the police in holding them to a strict observance of the traffic laws, insisting on proper recognition of every ordinance feature. The police are carrying the crusade to the limit, and the chief of police has issued a warning that violations will be tolerated for only a very brief period longer and then the court will have a chance to apply some pressure.

For years, owing mainly to the poor condition of Woburn streets, particularly in the centre, the motorists have been permitted to make their way about the city almost as they chose. The street surfaces generally were so rough that speeding was out of the question.

The City Council last year adopted traffic rules and though they have been somewhat enforced, still no rigid rules have ever been made to apply.

Following are the ordinance provisions which apply to the present crusade:

Section 45. The following rules shall be observed by all persons making use of the streets in the city.

First. A vehicle turning to the right into another street shall turn the corner as near to the curb as practicable.

as near to the curb as practicable.

Second. A vehicle turning to the left into another street shall pass to the right of and beyond the centre of the street intersection before turning.

Third. A vehicle crossing from one side of the street to the other within the limits of the business district, shall do so by turning to the left so as to head in the same direction as the traffic on that side of the street. No vehicle shall stop, in the business section, with its left side to the curb.

Fourth. In no case shall a vehicle re-

main backed up to the curb, excepting when actually loading or unloading. Fifth. Unless in an emergency or to allow another weblicle or pedestrian to cross its path, or on the order of a police officer, no vehicle shall stop in any public stream or bightway of this city. lic street or highway of this city, except close to the curb line.

Sixth, No vehicle shall stop or stand within the intersection of any streets. Seventh. In slowing up or stopping a

signal shall always be given to those be-hind by raising the whip or hand verti-

Eighth. Vehicles moving slowly shall keep as close us possible to the curb line on the right so as to allow faster moving vehicles free passage on the left.

Ninth. Vehicles must stop so as not to interfere with or prevent the passage of pedestrians at crossings, and at all times drivers of vehicles must stop the same on a signal from a police officer.

having charge of a No person wehicle in a public street shall refuse or neglect to stop the same or place the same as directed by a police officer, any of these rules to the contrary notwith-

Eleventh. No person shall drive or conduct any vehicle in such condition, or so constructed, or so loaded, as to allow Its contents to fall, blow, leak or sift upon the public streets,

Twelfth. No person having charge of a vehicle in a public way shall allow the same to stand within 15 feet of a fire hydrant.

Thirteenth. No person shall allow a motor vehicle to stand in any street or public way unattended, without causing the engine to be shut down completely.

Fourteenth. No person shall allow a motor vehicle to stand in any public street or way at any time between one-half hour after sunset and one-half hour before sunrise without having its lights turned on.

Worcester, Mass., Traffic Rules.

Worcester. At a recent meeting of the Board of Aldermen of this city the amendments to the ordinances and traffic rules were enacted as here noted:

The driver of any vehicle, when passing a street railway car traveling in the same direction may drive either to the right or left of said car, except on Front street, and on Main street, between Lincoin square and Chandler street, but shall not drive to the left of said car unless there is an unobstructed view of the road ahead for at least 100 yards.

Rule 36 has been struck out and the following substituted:

A person driving or controlling any vehicle on Pleasant street, between Main street and West street, shall not permit such vehicle to stop or stand upon Pleasant street, on either side thereof, for more than one hour except by written permisnion of the chief of police,

And provided further that a person driving or controlling any vehicle on Pleasant street between Main street and Chestnut street between Main street and Chestnut street shall not permit such vehicle to stop or stand upon Pleasant street, on either side thereof, between 11:30 o'clock a. m. and 1:30 o'clock p. m. and between 4:30 o'clock and 6:30 o'clock in the afternoon, except while taking on the street of or discharging passengers or loading and unloading merchandise, except by written permission of the chief of police,

Rule 42 was also struck out and the following substituted therefor:

A person driving or controlling any vehicle shall not permit said vehicle to stop or stand upon the following streets for more than one hour, and for that time only on the side of said street designated, except by written permission of the chief of police

Southerly side of Central street from Main street to Commercial street, southerly side of Exchange street from Main street to Commercial street, southerly side of Foster street from Main street to Commercial street, southerly side of Me-chanic street from Main to Commercial street, Norwich street, southerly side of Front street from Church street to Main street, easterly side of Waldo street, southerly side of Franklin street from Allen court to Portland street and on the northerly side of said Franklin street from the easterly side of the mall to Salem square, northerly side of Madi-son street from Main street to Beacon street, southerly side of Irving street, southerly side of Chatham street from Main street to High street, southerly side of Austin street from Main street to of Austin street from Main street to Chestnut street, southerly side of Elm street from Main street to Chestnut street, southerly side of Maple street, southerly side of Walnut street.

Boston Traffic Rules.

Boston. In order to better facilitate traffic operations in the shopping district during the holiday season special new rules reducing automobile and other vehicular privileges is likely soon to be adopted.

The City Council has received complaints that the congestion in Washington street and cross streets has not been completely remedied by the removal of the cars from 10 a. m. to 5 p. m. The approach of Christmas is likely to intensify present conditions.

May Give Parking Space.

Chairman Goodwin, after further consultation with his colleagues and the police, is likely to abolish the two-minute rule on Washington street, between Avery and Winter streets, under which vehicles are now permitted to stop for that length of time. He may also alter the 20-minute rule affecting Winter and West streets, Temple place, and perhaps Bedford street; prohibit unloading freight after 10 a. m. in certain streets of the shopping district, and establish a zone system in Washington street from Essex to Milk street, by which during the hours when there are no cars vehicles shall keep to the car tracks, leaving the rest of the street to pedestrians.

The possibility of establishing parking space in Charles street for automobiles as a further relief and partial substitute for reduction of the privileges under the present 20-minute rule is also under consideration.

HIGHWAY CONDITIONS.

Woburn, Mass. Lexington street from Pleasant street to the Woburn-Lexington line is now open to the public. This highway, which has been under construction for a considerable period, makes a most delightful connection between Woburn and historic Lexington.

"OWNER" AND OWNER'S RIGHTS DEFINED.

In two actions of tort tried together recently in Massachusetts, the first alleging the plaintiff's intestate's due care and the negligence of the defendant in operating an automobile, and while so negligently operating, the automobile collided with the plaintiff's intestate, who was thereby killed, and for conscientious suffering; the second, alleging practically the same complaint and further charging the defendant with negligence in suffering the automobile to be operated without being properly registered. Upon the close of the testimony the defendant's automobile company in this case asked the court to direct a verdict for the defendant for several reasons assigned. Questions were submitted to the jury, which answered the questions, and returned a general verdict for the defendant.

It appeared that the defendant company was a corporation engaged in selling automobiles and delivered to another defendant, one Nicksa, an automobile under an agreement in the form of a lease, which was a conditional sale. The amount agreed upon was to be paid in installments called "rent," and when fully paid obligates the "lessor" to transfer the title to the "lessee" when the first payment shall have been made "within the term of the lease." It expressly provided also that "all money paid as rent shall be applied and accepted toward such purchase," and that the price of the automobile shall be \$317.70. coincidentally, the same sum of money which the lessee by signature and seal promises to pay.

The court said that it is settled that the vendee in possession of personal property under a contract of conditional sale or lease, who has committed no breach of the terms of that contract, has a special property which he can sell or mortgage. And, further, that it was decided in a recent case that the word "owner" in the automobile statutes of 1909 and 1912 "includes not only persons in whom the legal title is vested, but bailees, mortgagees in possession and vendees under conditional contract of sale which confers ownership as between them and the general public for the purposes of registrations.

POLICE ACTIVITIES.

Lawrence. The state law prohibiting the driving of motor cars nearer than eight feet of a street car stopped to take on or let off passengers is being enforced in this city. This salutary law should be observed by motorists everywhere. It causes little hardship upon the motorist and is a real relief to pedes-

Concord. The police of this town are also strictly enforcing the rear light law.

Fall River. The Massachusetts Highway Commission has begun a campaign against the use of dazzling headlights in this city.









the proverbial drop in the bucket, it is extremely comforting. The old adage of "saving at the spigot and wasting at the bunghole" inevitably comes to mind. By all means the "bit" belongs as much to the engineer and designer as to the individual motorist. They are the factors to regulate engine efficiency and split gasoline so that it will do threefold work or more. More papers like that of Engineer Deppe before the S. A. E. and the work following is the Edison path toward real conservation.

Returning from the West Side, where he had just delivered her first car to a woman who had insisted on a multitude of particularities, the salesman was indulging royal dreams over the spending of his commission when the telephone bell rang. It was the buyer saying wrathfully, "Didn't you sell me this machine with the understanding that it was a self-starter?" "Yes, and it is." "How dare you contradict a lady, sir. I must push a button to make it go."

The Minneapolis Automobile Trade Association is organizing a motor reserve throughout the State of Minnesota which stands ready to respond to a call for service in transporting representatives of any branch of the government on war

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duty. R. B. Simning, assistant secretary of the association, is organizing the reserve and has picked a dealer in each city who is called upon to enroll at least 10 members in the reserve. The "Motor Reserve" as it is called, has notified the War Department that it stands ready to do its bit and has received a letter from Secretary of War Baker expressing his appreciation of their offer "of the very helpful and cooperative scheme."

Motor car thieves are continually devising new methods of hiding or disposing of their booty so that they will escape the clutches of the law. New York policemen discovered a car completely disassembled in that city in an old barn and after identifying it as one stolen from a New York dealer, the men who were arrested on the premises admitted their guilt and said they could get as much for the car by selling it piece meal as if disposed of complete and would not run near as great risk of becoming apprehended.

The old story of the artist who painted the plants so realistically that the servant watered them daily, loses its savor in face of the latest artistic genius, whose wonderful talent for landscapes might still be unknown like the "rose that was born to blush unseen and waste

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its fragrance on the desert air," had not her father called attention to it. He was on an automobile tour in the West and while witnessing a gorgeous sunset in the sky just streaked with lights that reminded one of the glories of the auro-



ra, was inspired to say: "It certainly is a mighty colorful sunset—certainly is—but you ought to see the one my daughter painted."

In the list of members of the "Ananias Clubs" which the National Committee of Patriotic Societies proposes to form, motor vehicle manufacturers expect to see the names of the following:

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The man who started the rumor that no gasoline will be available for motor cars.

The man who advised the world that the government is going to stop the production of motor cars; also the man who started the rumor that the government already has stopped motor car manufacture.

The man responsible for the statement that the government will not permit the sale of steel to motor car companies.

The man who invented the tale that all skilled automobile workers have been demanded by the government to be used on government work exclusively.

The man who declared that within a short time it will be impossible to purchase tires.

H. H. Hills, assistant general manager of the Packard Motor Car Co., declares that such rumors are vicious propaganda and all loyal Americans should do all they can to counteract these false stories.

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While the women drivers of Massachusetts constitute about eight per cent. of the licensed motor operators of the state, they were only involved in four per cent. of all the accidents, according to the highway commission report just issued. The women are apparently more careful in Massachusetts and more efficient, There are 11,000 women drivers in the state.

When the women of New York state



went over the top and captured the vote they established a precedent that may greatly extend their scope of activities in other ways in the affairs of men. At least this is the opinion of the governors of the Long Island Automobile Club, the oldest in the United States. When the notices were sent out for the annual meeting the members were surprised to note that their wives, sisters and sweethearts were invited, which marked the fall of an old precedent, as never before were the fair sex so honored as to be permitted to listen to the pearls of wisdom from the men folks at their annual pow wows.

A "motor messenger service" of menand automobiles is being organized by the Automobile Club of Philadelphia, which will be at the disposal of persons and agencies engaged in the entertainment of enlisted men. The cars of those who enlist will be given for transportation of men and women who take part in entertainments for soldiers and sailors at the Philadelphia Navy Yard, Camp Dix and Wrightstown, N. J.

Art as it exemplifies itself in the automobile body design has developed curious and wonderful creations, but none so striking and original as that conceived by Charles Kellog, a naturalist. While his finished job would claim most of its artistic merit through its rugged simplic-



ity, his material and methods inspires awe and wonder. Kellog went into one of the great red wood forests in California and after selecting a huge tree several hundred feet long and 11 feet thick at the butt, set to work hollowing it out and fashioning it into an artistic body providing sleeping and living quarters while entour. His Nash Quad, which hepurchased before starting work on the body, stood him in good stead, as he used it as a hammer and to manipulate the huge chisel which was specially constructed to excavate the interior of the log. When completed the job attracted such wide attention, a New York motor car dealer, hearing of it, went to California and brought it to Broadway, where it is one of the sights along the Great White Way.

The various motor schools are doing a valiant service for Uncle Sam. Every day boys in the uniform of Uncle Sam drop into the schools or write, the Michigan school reports, saying they had no difficulty in receiving just the kind of work they like. The army needs competent mechanics and the motor industry is furnishing thousands of them, because the motor service is the main stay of the army in regard to equipment and movement.

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MOTOR INDUSTRY REQUIRES LITTLE ALLOY STEEL.

The general impression that the motor industry's requirements of alloy steel were so great that its use was handicapping the munitions work and therefore called for a curtailment in the production of cars seems to be groundless according to dispatches from Detroit, the automobile centre of the world.

It is said to require about 75 tons of alloy steel in manufacturing a thousand cars, but engineers claim this consumption can be cut to 23 tons per thousand cars without greatly diminishing their quality.

JEFFERSON ELECTRIC WARNING.

The Jefferson Electric Manufacturing Co., Chicago, Ill., is warning the trade against a man calling himself "R. A. Spencer," who has been representing himself as a salesman of the company among New England automobile supply houses. He secured some of the company's products through jobbers or other channels and has been disposing of them to dealers at about 100 per cent, higher than list price, the company informs this The company sells its prodfournal. ucts only through jobbers and they have no traveling representatives by the name of Spencer. Neither do any of the repsentatives sell and deliver goods.

INTER-STATE CARS ADVANCED.

The Inter-State Motor Co., Muncie, Ind., announced a new price schedule on its cars which went into effect on Itec. 1. The new schedule is as follows: Five-passenger touring car, \$1000; two-passenger roadster, \$950; four-passenger roadster, \$1025.

PACKARD ADVERTISING MEN PLAN FOR DEALERS.

Branch advertising managers of the Packard Motor Car Co. from New York, Chicago, Cleveland, Philadelphia, Pittsburgh and other large centres recently held a convention at the factory in Detroit for the purpose of preparing an advertising campaign from the dealers' angle.

F. P. NEHRBAS MADE MANAGER.

F. P. Nehrbas, formerly production manager of the Premier Motor Corporation, Indianapolis, Ind., has been promoted to the position of general factory manager. Charles S. Crawford, associate chief engineer, has been made production manager.

PERLMAN SALES WILL BE HANDLED FROM JACKSON.

The Jackson Rim Co., Jackson, Mich., has been made the sales department of the Perlman Rim Corporation, also of Jackson, and hereafter the sales end of the Perlman Corporation will be handled from Jackson instead of New York City.

One Advertisement Eight Years Old Pulling Trade

Being the True Tale of a Fiji Islander's Delayed Response to a Car Announcement.

The power of advertising is generally thought of in terms of quick results and advertisers generally are not satisfied unless inquiries follow closely upon the appearance of their advertisement, but F. G. Clark, president of the Columbia Motor Truck and Trailer Co. of Pontiac, Mich., received a letter the other day which demonstrates that an advertisement may be effective after years have passed and that inquiries may then come from the most outlandish places on earth.

In this advertisement, which appeared in an automobile engine trade paper eight years ago, the Columbia Motor Truck and Trailer Co., then known as the Clark company of Lansing, Mich., proclaimed an 18 horsepower, water cooled, shaft drive motor car, which it has, of course, long ceased to manufacture.

The letter of inquiry is from Suva, Fiji Islands, and the inquirer says that if the catalogue shows the car to be what he wants, and if the first car is satisfactory, he will order others.

Even the trade paper in which the advertisement appeared is out of existence, despite the fact that its work goes on in an advertising way.

"One hears much of the fact that the printed work can never be as effective as the salesman's personal and ready appeal; that advertising is necessarily limited in its capacity to sell a possible prospect," says Mr. Clark. "This is true—so true that advertising does not try so much to sell, as to interest and cause the reader to inquire. But if advertising is limited in this way it more than makes up for its limitation by the duration of its appeal. The printed word endures and our children may possibly be sold on the advertisements which are being run in our papers of today."

AUTO COMPETITION FORCES RAILROAD TO SUSPEND.

A small railroad running out of Denver, Col., has filed notice with the public utilities commission of that state of its intention to go out of business owing to decrease in operating revenues resulting from the severe automobile competition.

R. E. INGERSOLL DEAD.

Raiph E. Ingersoll, vice president and general manager of the Reo Motor Co., Inc., of New York, died on Dec. 3, following an operation. He was one of the best known men in the automobile trade in New York. He was 42 years old and had been engaged in the motor car trade since 1905, when he opened a Reo branch

in Cleveland, O. The next year he was sent to New York, where he soon became vice president and general manager of the eastern Reo car agencies.

LOS ANGELES AUTO SHOW PROVED BIG SUCCESS.

The seventh annual automobile show of the Los Angeles, Cal., dealers proved a big success, as the business accomplished during the exhibition alone was nearly \$225,000. As there was no building in the city large enough for the exhibition, it was staged in the Billy Sunday tabernacle and three tents.

OPENS NEW SALES ROOM.

The Maibohm Motor Sales Co. opened its new sales rooms at 2637 Michigan avenue, Chicago, Ill., Dec. 3.

VALUE OF MARKING CARS AGAINST THEFT.

A car theft in Detroit recently, the subsequent investigation and the arrest and conviction of the thief has revealed a new way for car owners to identify their property, though it be in an almost uncognizable condition. The method is simple. All that an owner need do is to put some small, distinguishing marks on several of the component parts.

The Detroit case came to light when the Detroit Automobile Club started an investigation after a Ford car owned by Lawrence D. White of Owosso, Mich., a club member, had been stolen while White made a five-minute call in a downtown office building.

After several weeks a certain place advertising used parts for Fords was investigated. There the body, radiator and other parts of White's car were found and identified. The police questioned the shop owner, who finally told where he bought the car.

It developed that a supposed junk dealer, isadore Schwartz by name, sold the car for \$60. When arrested Schwartz said he had purchased the car on May 22 from a man who later joined the United States army. With sufficient evidence gathered by the police, Schwartz was held for trial in recorder's court.

At the trial the police produced George Wilson of Owosso, who testified he was the owner of the car in question on the date Schwartz alleged he had purchased it in Detroit. The car, Wilson said, was later sold to White. An Owosso garage owner, in whose place the car was stored on May 22, corroborated Wilson's testimony.

Only one ballot by the jury, which returned a verdict of guilty in 15 minutes, was necessary.

The Detroit Automobile Club advises motorists to place on the various parts of their cars some marks by which the vehicle can be distinguished, even though it be torn down to be sold piece by piece.

Action of this kind by all owners of motor vehicles would help cut down automobile thefts greatly, especially in large cities.



SCIENTIFIC FUEL SAVING DUE

Improved Refining and Engine Design Suggested Instead of Motorists' Drubbling Conservations

P. DEPPE, in a paper read at the meeting of the Metropolitan Section, S. A. E., Nov. 22, in New York, pointed out a method of engine design or improvement in carburetion so that a fuel composed of half gasoline and half kerosene can be utilized with a result of trebling the supply of motor fuels.

The paper was a rather long one and dealt to a considerable extent on the economical aspects of the fuel situation and its relation to prosecuting the war. Excerpts from the paper, touching on the salient points of interest, are given as follows:

"If any man can demonstrate such methods as commercially developed," says Mr. Deppe, "and by agreement beginning on the first of January, 1918, or any other future date, all new cars, trucks, tractors, etc., and even aeroplanes, were equipped to handle not only half kerosene and half gasoline mixtures, but could also handle with the same operating ability of true gasolines a low grade motor fuel oil consisting of 50 per cent. to 40 per cent. of all crudes, and allowing that in five years all existing vehicles will be worn out or become impossible to operate on such low grade fuels, but are in the meantime replaced by better engines and vehicles, it would mean with the cracking methods suggested by the bureau of mines that oil refiners could almost triple the production of what is now motor gasoline, consisting of but 18 per cent. of crudes produced in the world. That means nearly 200,000,000 barrels per year of motor engine fuel oils acting like true gasoline would be available.

"It seems to the writer to be an economic wrong of the first magnitude to pursue methods and use mechanisms with operating ability in motor vehicles which limit the oil refiner in the production of what is known as commercial gasoline to less than 18 per cent. of the total crude oil production of the world. He is only limited by carburetion methods now in use, his refinery capacity and ability being ahead of demands for refined oils and crude production.

"All nations have reached a point where as in the case of the steam engine means and methods must be devised and considered for immediate application, which will have the effect of not only producing more crude oils from existing or possibly new fields in the world, but effort should be made to devise means and methods of securing more than 18 per cent, of the desirable refined oils out of the crudes in the oil refineries for motor fuel, and what is the main theory the writer is endeavoring to suggest in this paper is the securing of more useful work out of each pound of the fuel oil used in internal combustion engines of any type. All cars now average less than 12 miles per gallon of gasoline. This average can be nearer 18 to 20 miles per gallon by better carburetion means, using mixtures of half gasoline and half kerosene or distillates and low grade fuels.

"Before we can suggest exact improvements in engines and oils and oil refining we must consider some things not clearly brought out as a rule.

"Oil refiners can now use in large commercial operations the following general types of cracking methods whereby it is possible to increase the production of so-called gasoline:

"First. Cracking oils as liquids with heat and pressure.

"Second. Cracking oils in vapor state with heat and pressure.

"Third. Cracking oils by the addition of steam or hydrogen, etc., in both the liquid and vapor states with heat and pressure.

"Fourth. Cracking oils in the superheated gas phase by adding steam and using pressure and temperature which causes partial combustion in the distilling plant.

'Men may devise gas producers using mineral oils whereby through applying high heat to the liquids or even using temperatures high enough to cause a partial combustion in the gas producer to make superheated dry gases, but not necessarily homogeneous fixed dry gas mixtures in cylinders, when they attempt to transfer such superheated gas to the intake manifold, the valve chambers or even into the cylinders themselves, where additional air supply is furnished. They are baffled by the loss of power and low fuel economy, lubricating oil dilution, etc., and perhaps do not realize that the expansion or intake stroke of the piston acts like a condensing chamber in the cracking process of the oil refiners as already mentioned herein, and pressure or compression raises the boiling point at some engine speeds and throttle openings.

"Many men do not realize that the time limit is so short for the movement and mixing of air and oil between carburetor and cylinder. It is not an easy thing to make superheated homogeneous fixed dry gases in any device which will allow the mixture to maintain itself as a superheated dry gas to the bottom of the intake stroke, so that the compression stroke will not waste its heat in merely partially vaporizing the liquid fuel oil more or less mixed with the lubricating oil, as now is the case with present wet mixture carburetor methods and present day low volatile and average of heavy hydrocarbons, known as commercial gasoline.

"It is no permanent solution of a dis-

agreeable problem to suggest curtailment of the use and production of passenger cars or to suggest a painfully small possible saving of gasoline in the hands of 5,000,000 gas engine users by stopping so-called leaks, incidental to the very use of gasoline in routine life.

"Prophecy is a dangerous pastime for anyone, but if the present world wide war lasts much longer, economic necessity will ultimately compel some military dictator to prohibit the sale of any motor truck or passenger vehicle using oil fuels which do not show at least 75 to 80 ton miles on ordinary roads per gallon of fuel consumed running at an average speed of 10 miles per hour."

Discussion centred on shortage of fuel in the Allies' transportation system.

BEARINGS SERVICE MEN WILL MEET IN CONVENTION.

Representatives of the Bearings Service Co. will hold a convention at the general offices in Detroit, Dec. 20 and 21. These men have been traveling for the past four months, establishing service agencies in the smaller towns and cities of the territories covered by the 22 branches. In the territories contiguous to Boston, Detroit, Chicago, Kansas City, Minneapolis, Omaha, Seattle, Los Angeles and Indianapolis, 175 agencies were established up to Dec. 1. This number will be increased to at least 450 within the next few months.

DETROIT STARTER CO. CHANGES ITS NAME.

The Detroit Starter Co., Detroit, Mich., has changed its name to the Versal Products Co., the change being made as the various devices produced by the company for some time have borne the trade name "Versal," and the manufacture of starters was discontinued some time ago.

A line of electrical apparatus for Fords is manufactured by the company, which enjoys close relations with the Ward-Leonard Co. through an exchange of patents. The Genolite, the principal product in this field made by the company, has gained great popularity as a lighting system through a patented drive, which eliminates the troubles that have been found with lighting systems on Fords in the past.

A big sales campaign will soon be inaugurated by the company on the Speederator, a device for Ford cars, which automatically regulates the speed of the engine and does away with racing the motor, stalling and bucking. Over 25,000 of these devices have been sold since the company started manufacturing them about a year ago. Thomas F. Mc-Manus, Inc., Detroit, will direct a national advertising campaign on this product, which will be launched in January.

Officers of the Versal Products are President, J. W. Fitzgerald; secretary and treasurer, H. Kirk White. C. F. Krueger is sales manager.



NOTICE TO READERS.

T HIS department contains the Mechanical Editor's answers to readers' inquiries. It is open to every subscriber. If any part of your car is not operating satisfactorily, or if you desire information regarding operating, maintaining or repairing motor cars. do not hesitate to lay your troubles before him. He will answer promptly and fully, either by mail or in these columns, as you direct. This service is free to every subscriber, and is often the means of saving considerable money that otherwise would be spent with a garage man. Letters should niways be algaed with the writer's full name and address, and the car or part in question should be properly identified, by mentioning the maker's name, model, year of production or other distinguishing feature. Address all inquiries to the Mechanical Editor.

THE AUTOMOBILE JOURNAL IDEA EXCHANGE.

For the benefit of readers of the Queries column it has been decided to conduct in this department a more widespread interchange of ideas. To this end the attention of readers is invited to the following question:

HOW DO YOU PREPARE TIRES FOR WINTER STORAGE AND WHAT ATTENTION DO YOU GIVE THEM IN WINTER?

To the writer of the best answer to the above question \$2.50 will be paid. For the next best answer \$1 will be paid. The best answers received will be published in the second issue after the appearance of the question in the magazine. Answers to the question should be in the hands of the editors by the 5th of January. The contest is open to every one.

EFFICIENT USE OF THE SPARK LEVER. Best Letter.

(R. L. Prindle, N. Abington, Mass.)

There is a right and a wrong way to use the spark lever on an automobile, and but few people realize how much power may be added by the proper advance or retardation of the spark.

After the engine is started the lever should be advanced in proportion to the speed at which the engine is running; not according to the amount of work the engine is doing.

This advance is needed because after the electrical contact has been made a short time elapses before the charge is ignited and sufficiently expanded to secure maximum pressure, and, of course, maximum power.

The higher the piston speed the earlier in the stroke should the timer contact be made in order that the highest pressure may take place at the most advantageous point. The spark should be advanced or retarded to the point where the engine pulls the best.

As the car slows down and the engine speed decreases, either from closing the throttle or because of excessive work, the spark must be retarded or the engine will pound and the explosions tend to force the pistons and crankshaft in the wrong direction.

A good operator learns to observe the effects of manipulating this lever and act accordingly. He can gauge the lever position for engine speed and gradually retard the spark as the engine is slowed down by work, always keeping just ahead of the knock.

The speed of the car should never be reduced by retarding the spark, as this results in a waste of fuel, overheating of the engine and an element of danger from firing through



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TIMES BUILDING PAWTUCKET, R. I.

the muffler. It is better to retard the speed by reducing the fuel.

For starting the engine the spark should be retarded so as to occur after the piston has started on the down stroke. After it has been started the spark should be advanced as far as possible without causing the engine to pound.

It often happens when proceeding along a fine level road, or slightly down hill, very good speed can be made without much throttle opening, by having the spark well advanced. Under these conditions the throttle should not be opened too suddenly.

A great deal is required of the ignition system today, since many of them are required to deliver about 60,000 sparks per minute, due to the engine speed, which may be from 1500 to 2000 revolutions per minute. The system must be kept at its highest efficiency and to do this the spark lever must be correctly handled.

Correct use of the advance and proper upkeep of the system means less gasoline consumption and a smoother running engine.

Second Best Letter. (R. S. Albertson, Benton, Pa.)

Proper manipulation of the spark lever means much when engine efficiency is considered. When an engine is being started by the hand crank the spark should be fully retarded to prevent back firing. When the starter motor is used, however, the spark may be advanced from one-quarter to one-half on the quadrant.

After the engine has been started the spark lever should be advanced about two-thirds of the quadrant distance and left this way until the gears have been changed to direct drive, then fully advanced.

The fully advanced position is correct for level and good roads. When a grade or hill is encountered which causes the engine to pound, the spark should be retarded until the knock ceases.

If it is found necessary to change gears, due to the laboring of the engine, the spark lever should be retarded about one-quarter of the quadrant until the gears are changed, then fully advanced as the engine gains in speed.

The spark lever should always be retarded as the engine speed is decreased from any cause and advanced with the speeding up of the engine. This is the best way to obtain full efficiency.

EXCESS OIL IN CYLINDERS. (C. R. S., Saratoga, N. Y.)

I have an eight-cylinder Oldsmobile that leaks oil past the rings and fouls up the plugs. Upon taking off the cylinder head I found oil on three of the pistons. Would you advise the installation of leak proof piston rings?

The clutch or transmission gives trouble at times and I find it difficult to change goars to second and third speeds. What do you think is the trouble?

There are three causes for excessive oil supply and leakage into the explosion chamber of an Oldsmobile engine. Excessive pressure in the oiling system, scored cylinders or poorly fitted piston rings.

The oil pressure gauge on the dash board should show a pressure of from 10 to 20 pounds when the engine is running at a speed corresponding to from 20 to 25 miles per hour. The pressure regulator is mounted on the left side of the crank case at the forward end. If the pressure is too high, unscrew the regulator adjustment until the adjustment is correct.

Examination will show whether the cylinders are scored. Small scores may sometimes be filled by Dixon's graphite. With the engine running at normal speed feed two or three teaspoonfuls of flake graphite into the carburetor air intake. If this fails to fill the scores the cylinder blocks should be either welded or filled by the plating process. You may also have the cylinders reground or rebored and new pistons and rings fitted.

If the cylinders are not scored or out of round, leak proof piston rings are to be recommended. That this type of ring

is giving satisfaction is evidenced by the fact that some car manufacturers have adopted them as regular equipment.

Your trouble in getting into the various speeds is probably due to rough teeth on the sliding gears of the transmission. The "grinding" of gears in changing gears burrs over the edges of the teeth so that they do not slide into mesh easily. If the teeth are not too badly worn you may be able to file off the burrs and round over the teeth so that they resemble their original shape. If the teeth are worn the only remedy is replacement of the gears.

SHORT LIFE OF LIGHT BULBS. (C. B. R., Depew, N. Y.)

Will you kindly tell me why the lights on my Studebaker 1914 car burn out? They light to normal candle power under ordinary conditions, but flare up when the starting switch is

In answer to yours of the 3rd relative to trouble with the lights on a Studebaker 1914 car. The side lights should not light up when the starting switch is pressed.

Your trouble is evidently due to a short circuit in the system at some point, probably between the battery and the starting switch; between the battery and the starting motor; or between the starting switch and starting motor.

The starting current from the earlier 1914 Studebaker cars was 12 volts, while the lighting current was only six. Should there be a cross circuit between any of the starter wires and the lighting wires, a result similar to your trouble would develop.

Make a careful examination of the wires in the starting system, as well as the starter switch and see if the wire is frayed or the insulation broken at any point. The starter wires leading between the units enumerated in the second paragraph above can be easily located because they are somewhat heavier than the other wires.

OVERLOADING A FORD MAGNETO.

(E. M. T., Fayetteville, N. Y.)

I have recently installed nine volt four candlepower dash and tail lights on my Ford 1917 car. Do these lights overload the magneto too heavily?

The installation of a four candlepower light on the dash, well as a tail light of the same candlepower, both lighted by current from the Ford magneto, is not to be recommended because of the strain upon the magneto.

We would suggest that you replace the four candlepower lights by two candlepower bulbs, thus relieving the magneto from some of the strain. The main trouble that you will find with this excessive overload will be the demagnetization of the permanent magnets in the magneto, evidenced by insufficient current in the ignition system and dull burning of the lights.

Just how long it will take to weaken the magnets depends upon the use of the lights, the speed of the engine and the type of lamp. There is little danger of burning out the magneto, since that unit is designed to carry an excessive overload.

KEROSENE AS A CARBON REMOVER.

(L. W. W., Westford, Mass.)

I have tried kerosene as a carbon remover, as directed in your Nov. 25th article, and though it has given satisfaction in a Ford car, after using it on my Maxwell, the engine skipped badly and upon examination I found that the flakes of carbon had caught between the valve faces and seats. What do you think of hydrogen peroxide as a carbon remover? Is it efficient, with no dangers and how should it be applied?

How can I pack the top of a double acting air pump, the smaller cylinder, so that it will be air tight?

The writer has had considerable experience with kerosene as a carbon remover and always found it entirely satisfactory if properly used. Where the engine is heavily carbonized the carbon is removed in large flakes and has a general tendency to catch in the valves and plugs.

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THE PACKARD TWIN SIX. (Continued from Page 13.)

removal of the cylinder blocks is unnecessary unless the cylinders are worn or the castings broken.

After the engine has been taken from the chassis the first step is the removal of the vibration damper, which is located on the front end of the crankshaft and upon which is carried the ratchet for the hand crank. Take off the four nuts which retain the springs and the front part of the damper may be removed, exposing the clutch unit, which is retained by the starting crank ratchet.

The starting crank ratchet is fitted with a left hand thread and should next be removed. The clutch unit may then be pulled from the crankshaft with a wheel puller.

In replacing this vibration damper unit it should be assembled and the spring tension tightened by the four nuts until the clutch slips at from 90 to 140 pounds, according to the make and equipment of the engine. This may be determined by winding a rope around the fan belt groove and attaching a pair of spring scales to one end of the rope. The scales may be fastened to a joist or other stationary object while the hand crank is being turned. The 1916 vibration damper should slip at 90 pounds, the 1917 four-ring and heavy piston installation at 110 and the 1918 four-ring installation at 140 pounds.

Twelve cap screws fasten the front timing gear case to the crank case; these should be removed and the timing gear cover taken from the housing. On the timing gear cover is mounted the helical gear and shaft which drives the distributor. The gear is retained by a nut and keyed to the shaft. When the gear is removed the shaft may be lifted out of the case.

Unless the timing gears show evidences of wear or the teeth are broken, it is inadvisable to remove them from their respective shafts, for both the cam and crankshafts may be taken from the engine without taking off the gears.

Both the crankshaft oil ring and the timing gear are keyed to the shaft and may be pulled off with a wheel puller. helical distributor drive gear, as well as the camshaft timing gear, are fastened by cap screws; the first to the second and the second to the camshaft.

The camshaft may then be slipped from the front of the engine. The front camshaft bearing may be driven out with a piece of lead or wood from the inside. The centre bearing is held in place by a set screw, which must be removed before the bearing is driven out. The rear bearing should not be driven out until the oil tube fitting connecting with the pressure gage is removed.

The crankshaft may be dropped from the bottom of the engine when the three main bearing caps have been taken The bolts which fasten the clutch drum to the flywheel, as well as those bolting the flywheel to the crankshaft flange, should be examined and if they do not fit the holes in the pieces they should be replaced with larger bolts, the holes having been reamed to fit.

After the gasoline pump has been removed from side of the crank case the shaft may be pulled out from the same side. Both of the gears on this shaft are keved on by means of Woodruff keys. This does not apply to the 1918 model, as on this machine the gasoline pump is located on the end of the generator shaft.

The transmission gearset and clutch unit are connected to the propellor shaft through a universal joint and the bolts which fasten the universal joint flanges together should be removed, the brake control rods disconnected and the change gear lever, together with the transmission cover plate, taken off. The transmission may then be taken from the car.

After Removing the Transmission.

With the transmission from the chassis the first step is the removal of the clutch unit. Unbolt the clutch shifter yoke from the pedal shaft and remove both the yoke and shaft. The clutch unit is mounted on and in the clutch spider, which is fastened to the main driving shaft by a nut and kept from turning by a key. A wheel puller may be used to remove this unit from the shaft.

The clutch unit is built up upon the clutch spider and consists of a number of steel discs placed between other discs which are faced upon both sides with special fabric. The fab-



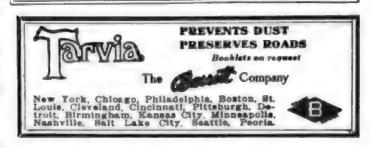
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First of all, you must prepare for this year—as we have prepared for it. Hunt out and wipe out your own weak spots. Put your own organization on a war footing. Be sure that in your "brigade" you have fighters, not "slackers." You may have to work harder to close sales. But the business is here.

You are dependent upon the company you represent to see you through when you are once "over the top." There are some "preferred" motor car companies—companies who have the popular cars, the courage, the experience, the vision and the financial resources to win the fight and help you win your fight.

The Paige is one of these "preferred" companies to stand in the front line, strong enough to stand any shock, organized, equipped and confident to win the bitterest battle.

The Paige is going to stand by its dealers. The Paige has the financial strength, the prestige, the public confidence, the organization to "come through" any conceivable situation. The Paige in 1918 will build enough cars for all Paige dealers and will sell every Paige car that is made. It is "preparedness" that wins battles. Are you prepared?

PAGE-DETROIT MOTOR CAR COMPANY DETROIT, MICH.











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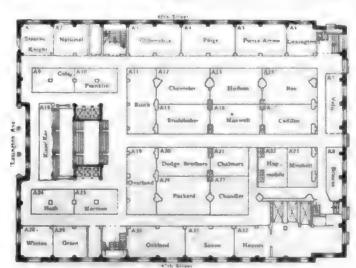
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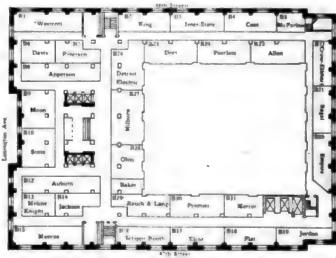
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Standard Oil Co. of New York	11
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Main Floor Grand Central Palace, Car Exhibits.



Second Floor Plan, National Automobile Show, Cars.

courage of their convictions of the industry's ability to ride out the period of war without suffering a setback.

In all 86 American car manufacturers are represented, including makers of steam and electric passenger cars. Jan.

8 will be observed as Army and Navy day. Wednesday. Jan. 9, will be Society day. Thursday will be observed as S. A. E. day. The annual dinner of the Motor and Accessory Manufacturers' Association will be held at the Waldorf on the evening of Jan. 9 and many other functions of an auxiliary nature to the show will be held during the week.

A patriotic scheme of decorations symbolizes the national spirit, as well as the whole-hearted and active participation in the war of the motor car industry. S. A. Miles, manager of the show, has been directing the creation of the hundreds of designs and tapes.

tries that will make up the decorative scheme from the flags of the Allies and the Stars and Stripes.

DETAILS OF THE CAR OF 1918.

Not including the exceptions which establish the rule, the 1918 motor car is

an embodiment of the principles and practises of the past several years with numerous minor refinements and improvements. It is a bigger car in length and proportions, has more power and costs considerably more. White last year about 10 per cent. of the models were priced at less than \$750, less than six per cent, are priced below that figure this year. Only 21 per cent. of this year's models list at less than \$1000, while last year nearly 28 per cent. sole below that figure. A year ago about 53 1/2 per cent. of the models were priced between \$1000 and \$2000, while this year only 49 per cent. are included in cars covered by that range of price.

On the other hand it can be operated more economically and has greater service value as a result of devices adopted for securing more power from a given

Third Floor Plan, Showing Car and Accessory Booths.

quantity of fuel and for using a cheaparade of fuel. This includes improvements in carburetion and automatic controls by the thermostat.

Many novelties will be seen in the coach work. Bodies are being made

Fourth Floor, All Spaces Devoted to Accessories.

lighter, yet are better constructed and have many innovations, including additional appointments in the way of panels, lockers and other features, which while used in some models in the past are now quite general on enclosed types.

Fewer makes are listed this In the tabulation of specifications on pages 29-41 of this issue, 149 makers of gasoline cars are listed as compared with 185 in last year's Careful numerical detable. ductions show there is a definite tendency this year in favor of the six-cylinder car, which shows 44.9 per cent. of the whole, as compared with the four-cylinder, 38.9 per cent.. and that the multi cylinder types, including the eight, 12 per cent., and 12-cylinder cars. four per cent., have about the same relation to the total of makes as they did last year.

Over 80 per cent. of the makes this year are either 1/2 elliptic, % elliptic or canti-

lever spring suspension, and this proportion is about the same as it was last year, but there is a decided tendency shown this year in favor of the ½ elliptic, this type being used on 38.7 per cent. of the makes, while last year it was

used on 35.6 per cent. The % elliptic type, which was used last year on 27.8 per cent, of the cars, is used on only 24.2 per cent. this year, while the cantilever is used this year on 29 per cent, of cars, as against 27.8 last year. These figures show a notable gain in popularity for both the 1/2 elliptic. as well as cantilever, over the % elliptic type. Five listed cars are using the elliptic type this year, the Franklin, Jackson, Metz, Dispatch and Briscoe, as compared with nine last year. The Packard, which was formerly equipped with this type, has adopted the 1/2 elliptic suspension. There are

four special types of spring suspension this year, three semi-cantilever and three using the platform.

there is a marked trend again this year in favor of the ignition systems of the secondary distributor type. Figuring on a basis of 149 makes of cars this year, as compared with 185 in last year's specifications, the number of models using this type is the same for both years, totaling 98; while magneto igni tion systems are found on 75 models this year as compared with a total of 101 cars last year. Remy, which was used on 3: models last year, is on 36 this year. Delco is used on 34 models this year as against 26 last year. Atwater Kent is on 22 mouels this year, as against 18 makes last year. Connecticut is on 31 cars this year as against 54 last year, and the musch system is used on 21, as against or last year. Dixie is used on six models, as against 11 last year. Westinghouse ignition, which was on 14 cars last year, is returned as on six models this year.

the average wheelbase length of all this is practically the same, about 120 menes, with a single tendency to longer wheelbase on the medium priced and high priced cars. The frumbull has the storiest wheelbase insted this year, 80 menes, while the Preice-Atrow presents the longest, 147½ inches.

the specifications also disclose an increased piston displacement, more valve in head motors and more equipment.

The specifications also disclose an inbased on the touring car or chassis price in the specifications, is \$2359, as compared with \$1831 last year ngured on prices as listed then. This average auvance of \$4/8 seems too large, but is not when the advance in prices on the six, eight and 12-cylinder models are taken into consideration. The average price of a four-cylinder car, as shown by this year's list, is \$1549, an increase of \$108 over last year's average price of \$1441. On six cylinder models, howeve. an advance of \$453 is shown in the average price, this years figure being \$2270, as compared with \$1817 last year. Even a greater advance is shown in the higher priced cars, as would be expected, the average price of an eight-cylinder car this year being \$2380, as compared with \$1723 last year, an increase of \$657. On the 12-cylinder cars the average price has increased from \$2545 last year to \$3240, an increase of \$695.

The Accessory Exhibitors List

A-B-C Starter Co., Detroit, Mich Adams Williams Mfg. Corp., N. Y. City. Adamson Mfg. Co., Elast Palestine, O. Advance Auto-Accessories Co., Chicago, Ill. Alexander Mfg. Co., J., New York City. Amazon Rubber Co., Akron, O. American Chauffeur Pub. Co., Cincinnati, O. American Ever Ready Works, L. I. C., N. Y. American Express Co., New York City. American Sleeve-Valve Motor Co., N. Y. C. Anderson Forge & Machine Co., Detroit, Mich.

Armstrong Cork Co., Pittsburgh, Pa. (Continued on Page 55.)

New York Show Car Exhibitors

(See Diagrams on Opposite Page.)

Following is a list of the cars that will be exhibited at the National Automobile Show at the Grand Cent ral Palace, New York, during the week of Jan. 5-12:

			11
Floor		Car Name	
34	C 8	Abbott-Detroit	2
2nd 3d	B 24 C 22	Allen American	*
30	C4	Anderson	
2nd	BB	Apperson	4
4114	B 12	Augurn	4
4444	C 14	Austin	-
Jet	A 8	Bribcue	1
154	A 11	DUICK	
THE	A 17	Cauliliec	
244	B 4	Case	d
lat	A 21	Changer	
1st Int	A 13	Chevrolet	0 0 0 0
lat	AV	Cute	
34	Câ	Corumbia	-
znd	R 53	Crow-Eikhart	
and	B 6	Davis	-
and ad	C 2	Deficit Prectice	
lat	A 20	Dogge Brothers	1
2nd	B 26	Dort	1
34	C 11	Eigin	
2nd	B 17	Elear	
znd	B 20	Empire	4
2nd 1st	B 16 A 10	Franklin	
3d	CS	F'rontinubile	
lut	A 29	Grant	
		Hackett	Į
34	C 3	Hal	
3d lst	C 15-16	Haynes	
3d	C 18	Holiter	
lat	A 13	Hudson	
lst	A 22	Hupmobile	
2nd	Ba	Inter-State	
and	B 14 B 19	Jackson Jordan	
2nd'	B 7	King	
lat	A 18	KisseiKar	
341	C 12	Kline Kar	
Let	A 6	Lexington	
30	C 19 A 25	Marmon	
2nd	B 5	MeFarlan	
1st	A 16	Maxwell	
2nd	B 31	Mercer	
and	13 27	Milburn	
181	A 28	Moline-Knight	
2nd 3d	C 18	Monitor	
2nd	B 15	Montos	
2nd	B 9	3100n	
3d	C 10	Moore	
ist	A 24 A 2	Nash National	
lst	A 30	Oakland	
2nd	B 28	Ohio	
131	A 3	Oldsmobile	
3d	C1	Olympian	
lat	A 19 B 29	Overland Owen Magnetic	
2nd 1st	A 26	Packard	
1st	A 4	Paige	
2nd	B 7	Paterson	
2nd	B 24	l'eerless	
lst	A 5 B 30	Pierce-Arrow Premier	
2nd 2nd	B 29	Rauch & Lang	
2nd	B 21	Regal	
tat	A 14	Reo	
3d	C 21	Roamer	
1nt	A 31	Saxon Scripps-Booth	
2nd 3d	B 16	Standard 8.	
3d	C 7	Stanley	
Int	A 1	Stearns Knight	
1st	A 15	Studebaker	
2nd	B 10	Stutz Templar	
3d 1st	A 7	Velle	
2nd	B 1	Westcott	
1st	A 19	Willys-Knight	

A 28

Winton

Woods

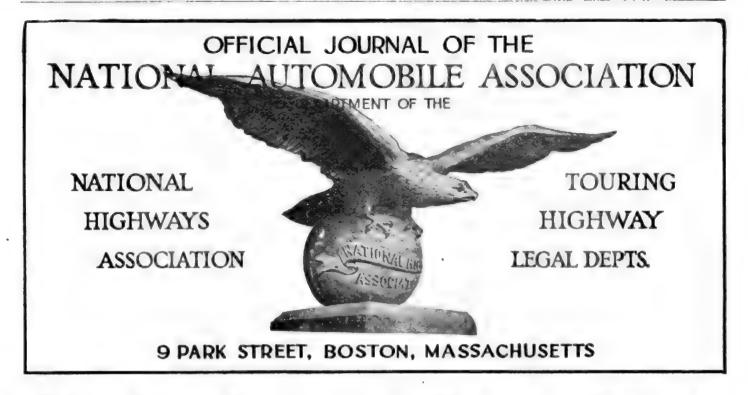
week of Jan. 5-12: Maker Abbott Corporation Allen Motor Company American Motors Corporation Anderson Motor Company Apperson Bros. Automobile Co. Augusta Automobile Co. Austin Aucomobile Co. DERCE IS, & D. COMPANY DESCOR MOTOR COSPORATION dutck stotor Company Cadillac applor Car Co. B. I. Case T. M. Company Chainers Motor Company Chainets Motor Car Company Chevrolet Motor Company Cole Motor Car Company Columbia Motors Company Crow-Eighart Motor Company Geo. W. Davis motor Car Company Anderson Electric Car Company Doble-Detroit Steam Motors Co. Dodge Brothers Dort Motor Car Company Eigin Motor Car Company Elkhart Car, and Motor Car Co. Empire Automobile Company F. I. A. T. H. H. Franklin Mfg. Co. Camden Motors Corporation Grant Motor Car Corporation Hackett Motor Car Company Hal Motor Car Company Harroun Motors Corporation Haynes Automobile Company Lewis Spring and Axle Company Hudson Motor Car Company Hupp Motor Car Corporation Inter-State Motor Company Jackson Automobile Company Jordan Motor Car Company King Motor Car Company
Kissel Motor Car Company
Kissel Motor Car Company
Kine Kar Corporation
Lexington-Howard Company
Liberty Motor Car Company
Nordyke & Marmon Company
McFarlan Motor Company Maxwell Motor Company Mercer Automobile Company Milburn Wagon Company Mitchell Motors Company Moline Automobile Company Monitor Motor Car Company Monroe Motor Company Moon Motor Campany
Moore Motor Vehicle Company
Nash Motors Company
National Mot. Car and Veh. Corp.
Oakland Motor Car Company Ohio Electric Car Company Olds Motor Works Olds Motor Works
Olympian Motor Company
Willys-Overland Company
Baker R. & L. Company
Packard Motor Car Company
Palge-Detroit Motor Car Co.
W. A. Paterson Co.
Pearless Motor Car Co.
Pierces-Arrow Motor Car Co. Pierce-Arrow Motor Car Co. Premier Motor Corporation
Baker R. & L. Company
Regal Motor Car Company
Regal Motor Car Company
Barley Motor Car Company
Saxon Motor Car Corporation
Saxions Boath Corporation Scripps-Booth Corporation Standard Steel Car Corporation Stanley Motor Carriage Company F. B. Stearns Company Studebaker Curporation Stutz Motor Car Company Templar Motor Corporation Velle Motors Corporation Westcott Motor Car Company Willys-Overland Company

The Winton Company

Woods Motor Vehicle Company

Address Cleveland, O. Fostoria, O. New York Rock Hill, S. C. Kokomo, Ind. Auburn, Ind. G. Rapids, Mich. Cleveland, O. Jackson, Mich. Flint, Mich.
Detroit, Mich.
Racine, Wis.
Detroit, Mich. Cleveland, O. New York Indianapolis, Ind. Detroit, Mich. Elkhart, Ind. Rienmond, Ind. Detroit, Mich. Detroit, Mich. Detroit, Mich. Flint, Mich. Chicago, Ill. Elkhart, Ind. Mich. Indianapolis, Ind Poughk'psie, N. Syracuse, N. Y. Camden, N. J. Cleveland. Jackson, Mich. Cleveland, O. Detroit, Mich. Kokomo, Ind. Chelsea, Mich. Detroit, Mich. Detroit, Mich. Muncie, Ind. Jackson, Mich. Cleveland, O. Detroit, Mich. Hartford, Wis. Richmond, Va. Connoraville, Ind. Detroit, Mich. Indianapolis, Ind. Connorsville, Ind. Detroit, Mich Trenton, N. J. Toledo, O. Racine, Wis. E. Moline, Ill. Columbus, O. Pontiac, Mich. Louis, Mo. Minneapolis, Minn. Kenosha, Wis. Indianapolis, Pontiae, Mich. Toledo, O. Ind. Lansing, Mich. Pontiac, Mich. Pontiac, Mic Toledo, O. Cleveland, O. Detroit, Mich. Detroit, Mich. Flint, Mich. Cleveland, O. Buffalo, N Y Indianapolis, Ind Cleveland, O Detroit, Mich. Lansing, Mich. Kalamazoo, Mich Detroit, Mich. Detroit, Mich. Pittsburgh, Pa. Newton, Mass. Cleveland, O. South Bend, Ind. Indianapolis, Ind 0. "leveland, Moline, Ill Springfield, O. Toledo, O. Cleveland O. Chicago, Ill.





What This Organization Does for Motorists

Operations and Services of the Legal, Highway, Touring, Supply and Insurance Departments—The Eagle Emblem and Free Magazine

THE National Automobile Association, the New England Department Massachusetts Division of the National Highways Association, which is now rounding out the 14th year of its existence, is enjoying the most flourishing state of its existence and this growth is a strong testimonial to the remarkable service it has rendered its members and motorists in general.

Through its service branches, the Legal, Highway, Touring. Supply and Insurance Departments, the organization has wielded a wide and powerful influence for the benefit of its members and motoring conditions, as it has continually conducted an active propaganda for road improvements, fair legislation and better conditions generally surrounding and affecting touring.

Some of the leading citizens of the Commonwealth of Massachusetts are interested in the association and serve in directing its affairs. Hon. John Lewis Bates of Boston, former governor of the state and a leading member of the Massachusetts Bar, is president. Roland F. Gammons is vice president, Charles J. A. Wilson is treasurer and George Hamilton Power secretary. The trustees are: Charles D. Lanning, Boston; Royden Loring, Boston; William B. Plunkett, Adams; Frank A. Dewick, Boston; Arthur H. Lowe, Fitchburg; Harry J. Olmsted, Winchester; Edgar W. J. Hearty, Boston, and Raymond F. Briggs, Norton.

Headquarters of the National Automobile Association is located at 9 Park street, Boston, Mass.

Probably the most noteworthy work accomplished by the organization is in its participation in legal affairs, giving as it does, free legal advice and assistance to members in all their automobile troubles and accidents. Members are defended free for violations of automobile laws anywhere in New England and in suits brought against them for damage to property or matters of bills for repairs where unreasonable charges have been made. Cooperation with the public authorities in securing the revocation of the licenses of unreasonable, reckless or intoxicated drivers is also undertaken by the organization and other work along similar lines to promote safer road conditions.

While the membership fee is only \$5 annually, the service it entitles the member to is far greater than could be secured were it not for the cooperative effort of the large membership. Many times this fee is realized by the member in the course of a year in the form of services, information, advice and touring matter. The fact that there are over 70 attorneys representing the association makes it possible to get in touch with an advisor on short notice in case of a conflict with the authorities, which is a common occurrence and often unnecessarily inconveniences tourists.

In addition to these services which are contingent upon their requirement, members also receive equipment that has immediate tangible value. A beautiful nickel eagle, insignia of the association, which was designed by the celebrated

sculptor, Bela L. Pratt, is given each member as a radiator emblem, also one of the Red Road Books, containing road maps covering New England, New York, New Jersey, Pennsylvania, Maryland, Delaware and Virginia; besides 153 city street maps and valuable touring information.

Through the Automobile Journal, the offical magazine of the association, which the members receive free, they are given twice monthly a review of the activities of the organization, information bearing on legal matters, touring news and other information. In addition to this insert in this magazine, devoted exclusively to the N. A. A. matters, the members receive the general information of the motor car industry which is chronicled in the Automobile Journal, including touring stories, descriptions of new cars, accessories and new mechanical devices.

Additional touring data is also furnished in the form of the special maps covering the principal touring routes in this part of the country, and the N. A. A. route cards and timely bulletins, the latter containing detailed road directions, maps, location of traps, laws, police activities. Special motor tours to this country and Canada are also prepared by the association, and the member who contemplates either a short or long tour can call upon the Touring Department and receive an itinerary giving points of interest along the way, recommendations as to the best hotels and garages to patronize and an approximate sum of the cost of the trip.

When a motorist joins the National Automobile Association he automatically becomes a member of the National Highway Association, and becomes personally identified with the great work that organization is accomplishing in behalf of good roads throughout the nation. This membership is free and carries with it the membership button, costly four-colored plate maps and other valuable publications and data sent out by the organization.

Members also receive assistance in recovering stolen cars and articles and are assisted in securing competent chauffeurs and reliable advice and service in procuring proper insurance policies.

In fact, the association is an organization of motorists banded together for the purpose of securing the benefits that can come only from cooperative effort and which include practically all the services that are required by those who use automobiles, and these services are secured at a minimum of cost. Such an association of persons, wielding its strength of numbers in behalf of better legislation and good roads, not only contributes to the mutual welfare of all the members. but also the good of the public at large. Through the highway department alone much has been accomplished in eliminating dangerous curves and corners, reduction of hedges, bushes, trees, sandbanks and other obstructions along the highways, and the erection of uniform sign boards that greatly aid the motorist in following routes and reaching their destination with the most convenience and without accident.

Law Draws Line on Car Larceny

Iowa Jurist, in an Intricate Joy-Riding Case Shows Distinction Between Deceit and Theft

NASMUCH as most of the motor vehicle laws contain a provision making it a criminal offense for a person to use another's automobile without his consent, the following lowa case throws considerable light upon this law.

It appears that a man was indicted under a section of the state code for stealing an automobile and he was tried and acquitted by a jury.

The part of the code material to the question in issue was as follows: • • • "If any chauffeur or other persons without the consent of the owner take, or causes to be taken, an automobile or motor vehicle and operate or drive or cause the same to be operated or driven, he shall be imprisoned."

At the close of the testimony in the case counsel for the state requested the court to give the following instruction:

"That consent given by the owner of the car, given for specific purpose or for a stated time, would not be consent to use the car for a different purpose, nor generally, nor for any unlimited time, and the consent to use the car for a period of 15 or 20 minutes would not be consent to drive a car to a place named."

The court refused to give the above instruction, but in lieu thereof gave the following:

"The gist of the offense charged is taking and driving the motor car in question without the consent of the owner. The defendant is not on trial in this case for any other offense than that charged in the indictment. If the owner consents to the person charged taking and driving the car, then the person charged cannot be convicted of taking and driving the car, even though he may drive it for a longer distance, or may damage the car, or even convert it to his own use. If the owner consents to the taking and driving and suffers any wrong therefrom, then his remedy is something other than a prosecution

under the statute for taking and driving without his consent.

the above statute, the Supreme Court of lowa says, was evidently enacted for the purpose of providing punishment for the taking and operating of an automobile or other motor vehicle, or causing the same to be taken and operated, without the consent of the owner, under circumstances not amounting to larceny.

(1) The taking of the motor vehicle and operating the same, without intention of appropriating it permanently to the use of the person so taking and operating it, is not larceny, and could not be oursished as such.

It appears from the evidence that the defendant obtained consent of the owner to take and operate his automobile for 15 or 20 minutes and that after obtaining possession thereof, drove the same to Ottumwa, and then with some companions to Muscatine, where the car became disabled and was left in a garage. It is contended on behalf of the appellant that consent obtained by trick, deceit or misrepresentation is consent in fact.

(2) The word "consent" as used in this connection, we think, should be interpreted as meaning voluntarily yielding the will to the possession of another, acquiescence or compliance therewith, The owner's consent must precede the act of taking or assuming possession of the motor vehicle, and does not relate to what transpires thereafter. As said by the court the gist of the offense is the taking or operating, or causing a motor vehicle to be taken or operated by another without the consent of the owner. The statute was not designed to punish one who obtains consent of the owner to take and operate his motor vehicle by misrepresentation or for a fraudulent purpose, but one who takes possession therefore without the consent of the owner. Held that the ruling of the trial court was substantially correct.

NOTICE TO ALIEN ENEMIES.

An embarrassing situation has developed for motor vehicle owners of the country who have in their employ as chauffeurs men of countries with which the United States is at war and who come under the classification of "alien enemies." It has come to the attention of the general counsel of the association that there are quite a number of the above described chauffeurs now in the employ of Americans, and in order that they may be saved not only from annoyance, but possible arrest and imprisonment, it will be advisable for all concerned to bear in mind the recent proclamation of the President of the United States and the subsequent orders of the Department of Justice, as promulgated by the United States marshal for the District of Massachusetts, and govern themselves accordingly.

The notice to alien enemies is that all "alien enemies" must keep 100 yards from all docks, wharves and piers in the district of Massachusetts. They must not be employed in any maritime occupation in the waters adjacent to the district of Massachusetts.

Any "alien enemy" found within 100 yards of any dock, pier or wharf, or employed in any maritime occupation, will be immediately arrested. It is the duty of all citizens to notify this office of any violation of any of the foregoing rules.

MASSACHUSETTS AUTOMO-MOBILE REGISTRATIONS.

There are now 214,299 persons in the state authorized to operate motor vehicles, exclusive of motorcyclists. The new licenses, including both private operators and chauffeurs, number 69,487, and the renewed licenses 144,742. Nearly 27,000 people who were licensed to operate last year failed for one reason or another to renew their licenses this year.

There were registered 174,274 motor cars and trucks, the latter numbering 26,008. The increase in the total of cars and trucks is 37,465, compared to 34,176 the year previous. While in actual numbers the increase this year was greater than last, there was a falling off in the percentage of gain, the increase this year being about 27 per cent. compared to 31 per cent. in 1916. The trucks also fell off in percentage, which is 37 this year compared to 52 last year.

A comparison of the automobile business of the commonwealth for the years 1916 and 1917 follows:

	1916	1917
Automobiles	\$136,807	\$174,274
Motorcycles M a nufacturers	10,713	11,165
or dealers	1,977	2,379
Licenses (operator and chauffeur Operator and	56,903	69,487
chauffeur re- newals E x a m inations	114,693 12,506	144,742 17,336

Total receipts. .\$1,564,363.81 \$1,969,813.15

Passenger Cars and Car Makers for 1918

Listed Alphabetically with Addresses of the Manufacturers

ABBOTT, Abbott Corp., Cleveland, O. ALLEN, Allen Motor Car Co., Fostoria, O. AMERICAN, American Motors Corp., Plainfield, N. J. AMERICAN BEAUTY, Pan American Mo-

tors Co., Chicago, Ill.

ANDERSON, Anderson Motor Co., Rock Hill, S. C. ANDERSON ELECTRIC. Anderson Elec

tric Car Co., Detroit, Mich.
APPERSON, Apperson Brothers Auto Co..

UBURN, Auburn Automobile Co., Auburn, Ind. AUBURN.

AUSTIN, Austin Automobile Co., Grand Rapids, Mich. BAKER, R. & L., Baker, R. & L., Co. Cleveland, O.

BELL, Beil Motor Car Co., York, Pa. BIDDLE, Biddle Motor Car Co. Philadel-

BINCH, Birch Motor Cars, Chicago, Ili. BOLK-DAVIS, Shadbourne Combined Motors Co., Chicago, Ill.

BREWSTER, Browster & Co., Long Island

City, N. Y. BRISCOE, Briscoe Motor Corp., Jackson. Mich.

Btich, Buick Motor Co., Flint, Mich. Bosn, Bush Motor Co., Chicago, Ill.

CADILLAC, Cadillac Motor Car Co., Detroit, Mich.

CAMPHELL, Campbell Motor Car Co. Kingston, N. Y. CASE, J. I. Case T. M. Co., Racine, Wis.

CHALMERS, Chalmers Motor Co., Detroit Mich.

Chandlich, Chandier Motor Car Co. Cleveland, O.

CHECKULET, Chevrolet Motor Co., Flint,

COLE, Cole Motor Car Co., Indianapolis,

COLL MBIA, Columbia Motors Co., Detroit, Mich.

COMET, Comet Automobile Co., Decutur. 111.

COMMONEALTH ULTRA, Commonwealth

Motors Co., Chicago, Ill. CRAWFORD, Crawford Automobile Co.. Hagerstown, Md.

CROW-ELKHART, Crow-Elkhart Motor Car Co., Elkhart, Ind. CRUISER, Cruiser Motor Car Co., Madi-WL

CUNNINGHAM, J Cunningham Son & Co., Rochester, N. Y.

DANIELS, Daniels Motor Car Co., Read-

ing, Ps. DAVIS, G. W., Davis Motor Car Co., Rich-

DETROIT ELECTRIC, Anderson Electric Car Co., Detroit, Mich.

DISPATCH, Dispatch Motor Car Co., Minneapolis, Minn.
DIXIE PLYER, Dixie Motor Car Co., Louisville, Ky.

DOBLE, Doble-Detroit Steam Motors Co.,

Detroit, Mich. DODGE BROTHERS, Dodge Brothers, De-

DORRIS, Dorris Motor Car Co., St. Louis,

DORT, Dort Motor Car Co., Flint, DOUGLAS, Douglas Motors Curp., Omaha.

Neb. DINN, Dunn Motor Works Ogdensburg.

EAGLE, Eagle-Macomber Motor Car Co.,

Sandusky, O. ECONOMY, Economy Motor Car Co., Tiffin. O. ELCAR, Elkhart Curriage and Motor Car

Co., Elkhart, Ind ELGIN, Elgin Motor Car Corp., Chicago,

EMPIRE, Empire Auto Co. Indianapolis.

ERIE, Erie Motor Car Co., Painesville, O.

FAGEOL, Fageol Motors Co., Onkland, Cal. FIAT, F. I. A. T. Co., Poughkeepsie, N. Y. FORD, Ford Motor Co., Detroit, Mich. FRANKLIN, H. H. Franklin Mfg. Co., Syracuse, N. Y.

PRITCHLE, Fritchle Electric Co., Denver.

FRONTMOBILE, Camden Motors Corp..

Camden, N. J. B. P., F. R. Porter Co., Port Jefferson,

GERONIMO, Geronimo Motor Co., Enid,

GHENT, Ghent Motor Co., Ottawa, Ill. GLIDE, Bartholomew Co., Peoria, Ill. GRANT, Grant Motor Car Corp., Cleveland, O.

HACKETT, Hackett Motor Car Co., Jack-

son, Mich.

HAL, Hal Motor Car Co., Cleveland, U.

HALLADAY, Barley Motor Car Co., Streat-

HAMROUN, Harroun Motors Corp., Detroit, Mich.

HARVARD, Harvard-Pioneer Motor Car Co., Troy, N. Y. HABSLER MOTOR Co., Indianapolis, Ind.

HATFIELD, Cortland Cart and Carriage Co., Sidney, N. Y.

HAYNES, Haynes Automobile Co., Koko-mo, Ind.

HESELTINE, Heseltine Corp., New York. HOLLIER, Lewis Spring and Axle Co.

Chelsea, Mich. HOLMES, Holmen Automobile Co., Can-

ton, O. HOMER-LAUGHLIN, Homer-Laughlin

Eng. Co., Los Angeles, Cal. HUDSON, Hudson Motor Car Co., Detroit.

Mich. HUPMOBILE, Hupp Motor Car Co., De-

troit, Mich. HUPP-YEATS ELECTRIC CAR CO., De-

INTER-STATE, Inter-State Motor Co., Muncie, Ind.

JACKSON, Jackson Automobile Co., Jackson, Mich.

JONES, Jones Motor Car Co., Wichitz. Kan.

JOHDAN, Jordan Motor Car Co., Cleveland, O.

KING, King Motor Car Co., Detroit, Mich KISSELKAR, Kissel Motor Car Co., Hartford, Wis. KLINE, Kline Car Corp., Richmond, Va

KNIGHT SPECIAL, Watson & Store 251 West 57th St., New York City. Stoeckel

LAMBERT, Buckeye Mfg. Co., Anderson

LAUREL, Laurel Motor Car Co., Richmond, Ind. LENOX, Lenox Motor Car Co., Boston

LEXINGTON. Lexington-Howard Connersville, Ind.

LIBERTY, Liberty Motor Car Co., Detroit.

LOCOMOBILE, Locomobile Co. of Amer-

ica, Bridgeport, Conn.
LOZIER, Lozier Motor Co., Detroit, Mich
LUVERVE, Luverne Automobile Co., La verne, Minn.

MCFARLAN, McFarlan Motor Co., Con nersville, Ind. MACON, Macon Automobile Co. Macon

MADISON, Madison Motors Co., Anderson Ind.

MAIBOHM, Maibohm Motors Co. Racine Win.

MAJESTIC, Majestic Motor Co., New York.

MARMON, Nordyke & Marmon Co., Indianapolis, Ind.

MAXWELL, Maxwell Motor Co., Detroit

Mich.

MERCER, Mercer Automobile Co., Tren-

ton, N. J.
WETZ, Metz Co., Waltham, Mass.
MILBURN, Milburn Wagon Co., Toledo, O.
MITCHELL, Mitchell Motors Co., Racine.

MOLINE-KNIGHT, Moline

Co., East Moline, Ill. MUNITUR, Monitor Motor Car Co., Colum-

bus, O. HONHOE, Monroe Motor Co., Pontin

Mich, Moon Motor Car Co., Ht. Louis, Mo-HOORE, Moore Motor Co., Minneapolis,

Minn.

HIRRAY, Murray Motor Car Co., Pitts burgh, Pa.

MASH. Nash Motors Co., Kenosha, Wis NATIONAL, National Motor Car and V. hicle Corp., Indianapoiis, Ind. NAPOLEON, Traverse City Motor Car Co.

Traverse City, Mich.

NELNON, B. A. Nelson, Detroit, Mich.

NORWALK, Norwalk Motor Car Co., Martinsburg, W. Va.

OAKLAND, Oakland Motor Car Co., Pontiac, Mich. Onio Electric Car Co

Toledo, O. OLDSMOBILE, Olds Motor Works, Lan

sing, Mich. OLYMPIAN, Olympian Motors Co., Pon

OVERLAND, Willya-Overland Co., Tole

do. O. OWEN-MAGNETIC, Baker R. & L. Co.

Cleveland, O. PACKARD, Packard Motor Car Co., De

troit, Mich. PAIGE, Paige-Detroit Motor Car Co., De-

troit, Mich. PAN AMERICAN, Pan American Motors

Co., Chicago, 11t. PAN, Pan Motor Co., St. Cloud, Minn.

PARTIN-PALMER. Commonwealth Mo-tors Co., Chicago, Ill.

PATERSON, W. A. Paterson Co., Flint. Peerless Motor Car Co.

PEERLESS, P. Cleveland, O. PHIANNA, Phianna Motors Co. Newark.

N. J. Motor

PIERCE-ARROW, Pierce-Arrow Car Corp., Buffalo, N. T. PILGRIM, Pilgrim Motor Cur Co., Detroit

Mich. PHOT, Pilot Motor Car Co., Richmond.

PREMIER, Premier Motor Corp., Indianapolis, Ind.

PHINCESS, Princess Motor Car Corp., Detroft, Mich.

REGAL, Regal Motor Car Co., Detroit. Mich.

HEO, Reo Motor Car Co., Lansing, Mich ROAMER, Barley Motor Car Co. Streator 111.

NAVERS, Sayers Scovill Co., Cincinnati O

CRIPPS-BOOTH, Scripps-Booth Detroit, Mich.

Seneca Motor Car Co., Fon SENECA.

SIMPLEX, Simplex Auto Co., New Brunswick, N J.

WINGER, Singer Motor Co., New York,

STANDARD, Standard Steel Car Co, Pittsburgh, Pa.

STANLEY, Stanley Motor Carriage Co. Newton, Mass. STEARNS-KNIGHT, F. B. Stearns Co.

Cleveland, O. S. S. E., S. E. Co., Philadelphia, Pa S. S. E., S. E. Co., Philadelphia, Pa ELEMETRIC, Pay Electric STEINMETE ELECTRIC. Day Electric Corp., New York, N. V. STEPHENS, Stephens Motor Branch Mo-

line Plow Co., Moline, Ill.

STUDEBAKER, Studebaker Corp., South Bend, Ind.

STUTZ, Stutz Motor Car Co., Indianapolis,

TEMPLAR, Templar Motors Corp., Cleve-

TRUMBULL, Trumbull Motor Car Co., Philadelphia, Pa.

VEG.IE. Velle Motors Curp., Moline, Ill.

WESTCOTT, Westcott Motor Car Co

Springfield, O. WHITE, White Motor Co., Cleveland, O. WILLYS-KNIGHT, Willys-Overland C.

Toledo, O. WINTON, Winton Co., Cleveland, O.

WOODS DUAL POWER, Woods Motor Vehiele Co., 25th St., Chiengo, III. WOLVERINE, Wolverine Motors, Inc., Kalamazoo, Mich.

YALE, Saginaw Motor Car Co., Saginaw

Meaning of Terms Used in Specifications

Hernepower (S. A. E.)—Horsepower in each instance is according to the rating of the Society of Automobile Engineers, whose formula has been generally accepted as standard and consists of multiplying the square of the diameter of the plying the square of the diameter of the cylinder bore in inches by the number of cylinders and dividing by the constant 2.5. The solution of this formula gives the horsepower at 1800 feet per minute piston speed and should not be taken to indicate the maximum power of which an engine may be capable.

Piston Displacement-This designation Piston Displacement.—This designation is intended to express the space through which the pistons sweep in the cylinder during the completion of one of their strokes. This is determined by multiplying the square of the bore in inches by the constant .7854, and this result by the number of cylinders and finally that sum by the length of the stroke in inches.

Cylinders, Shape and Cast—This refers to the number of cylinders, the general contour of the engine and how the cylinders are grouped. The shapes of the en-gines are expressed as L-head. T-head, I-head and V. In the L-head type the valves are all on one side; in the T-head, inlet valves are on one side and the exhaust on the other; in the I-head, the valves are in the head, or there may be one set in the head and another on one side. In the V shaped engine, the valves may be in the head or on the sides, either or on the outside, or a combination of these locations. The grouning of the cylinders is expressed either by block (cylinders all integral), separately block (cylinders all integral), separately (each cylinder individual), 2s (in pairs), 3s (in groups of three each) 4s (an eight-cylinder engine in two blocks of four each), 6s (a 12-cylinder engine with two blocks of six cylinders each).

Type Camshaft Drive-Under this head appears spur, helical and chain, the first referring to a plain spur sear driving the campbaft the second a helically cut gear and the third a slient chain drive.

Cooling Thermo-syphon tems, or natural flow methods, require no circulating pump. In the nump system a centrifugal pump generally is used to the water through the cooling in-

Linkrication System. Three systems are nown. The spinsh system consists of The anown. The apiesh system consists of distributing the oil in the crank case by means of dips on the connecting rod ends. In the force feed the oil is numped to the working parts through leads. The force feed and splash is a combination of the two other methods

Ignition Type-Four evatems are tioned. The single has one source of cur-cent and one set of spark plugs. The double includes magneto and battery and two sets of nlugs, of which only one set operates while the engine is running. The dual has battery and magneto and one set of plugs. Two-point ignition has nlugs double-distributor magneto and two sets of pluge which operate simultaneously,

First Fred.—In the gravity system the grandine flows naturally from a tank in the cowl, or one under the seat to the carburetor. In the vacuum system ensisten suction in an anxiliary tank connected with the carburetor and a tank at

What the Abbreviations Indicate.

SHAPE: I, I-head; L, L-head; T. T-head; V, like letter V.

T-head; V, like letter V.

CAST: Block, cylinders integral;
Sep., separately; Ss. in pairs: Ss. in
threes; 4a, in two blocks of four
each; 5s, in two blocks of six each.
MAKE OF ENGINE: G. B. & S.

Belknap & Schwarz; H.
n. Homer-Laughlin; H.-Laughlin, Spill. Herscheil-Spillman; M Knight, Moline-Knight; Tur. Moore, Turner & Moore; Wo Mil., Woods-Milwaukee.

Moore, Mil., Woods-Milwaukee.

VALVES: Inside, on the inner sides of the V: Outside, on the outer sides of the V: R. & H., right side and head; R. & L., right and left sides: Sleeve, Knight type of engine, CLUTCH: B. & B., Borg & Beck; B. & L., Brown & Lipe: Brew., Prewater.

Ther.-Syp., thermoayphon.

LUBRICATION: Force F., force feed: F. F. & Spl., force feed and

IGNITION MAKE: At, Kent., water Kent: Conn.. Connecticut: D.-Bijur, Delco and Bijur; Rise.. Elsemann; Split.. Splitdorf: West.. Westinghouse; West., B. Westing-house and Bosch.

tomatic: Hand, manual: H. & A., hand and automatic.
CARBITETOR.

CARBURETOR: A. W. T., Ameran Watch & Tool Co.; Hol.-Kgn.,

ican Watch & Tool Co.; Hol.-Kgn., Holley & Kingston. STARTING AND LIGHTING: Heinze-Spring., Heinze-Springfield: Pil. or Auto L., Pilliod or Auto Lite: Stud-Wagner. Studebaker-Wagner: West., Westinghouse: U. S. L., United States Lighting: Ward-

Leon, Ward-Leonard,
GEARARTT Plan-Unit, M. nlanetarv, in unit with engine; SelecAmid, selective, amidshins; S-Unit
M. selective, in unit with engine; 8-Unit, X, selective, in unit with

GRARBET MAKE: Brew. Brew-ster: Det., Detroit: Dur. Durston: G. Is, Grant-Lees: M. Mech. Me-chanics Machine Co.; W. War

TIRES: P. & R. front and rear wheels carry same size tires: colon hetween figures indicates sizes for two models: commo between figurer indicates sizes of rear and front wheels on one model.

SPRINGS: Double Canti., double cantilever: 4 Ell Cant., semi-ellip-Donble Canti., donble cantilever

AXLES: Type, F. F., full float-g. Make, A. B. B. American Ball Bearing: Colum Columbia: Salis, Salishurv: W. M. Weston-Mott: W. W. Walker-Weiss,

REARINGS: B & R., Ball and Ball and roller; C.& C., N D., New Departure.

the rear draws the fuel to the vacuum tank from which it flows by gravity to the carburetor. In the pressure system the fuel is forced by air pressure from the rear tank direct to the carburetor.

Type of Ciuteh—Under this classification disc includes single and multiple plate types and those that run either ir cil or dry. D. D. indicates dry disc. The cone type is familiar without explanation.

Type of Gearset-Selective refers to the type in which any speed is reached direct The planetary system is distinctive be-cause when in second speed the whole gearset turns as a unit, while the internal gears turns as a unit, while the internal gears do not revolve around each other. In the progressive type it is necessary first to pass through first speed to reach higher ones. Friction drive is by a fric-tion disc pressing against a driven dis-attached to a shaft that turns the wheels Unit with motor indicates that the gearset and clutch housings are integral with the engine—a unit power plant. Unit with rear axle means the gearset is in-tegral with the axle housing, while amid-ships shows that the gearset is midway between the axle and engine.

Drive Through—This refers to whether there is a torque tube surrounding the propeller shaft, or a torque arm placed along side the shaft from the differential frame cross member, while springs refer Type of Rear Axie—In the full float-

ing type the weight is carried on the axle housing and the axle is flexibly attached to the wheels. The % floating is similar nousing and the axie is nexibly attached to the wheels. The % floating is similar to the full floating except that the axie is permanently attached to the wheels. In the % floating the bearings are in the axie housing and the axie shaft not only turns the wheels, but helps support the load. The dead type is found only in cars driven by chains, the axle being stationary.

Direct Drive Ratio-The relation of the speed of the crankshaft to that of the wheels on high gear is the reference here. In other words, if the engine turns over three times to one revolution of the rear wheels on direct then the ratio is three to one.

Springs--Elliptic aprings their names from their shapes. The ellip-tic has the form of a full ellipse; in the tic has the form of a full ellipse; in the & elliptic half of the upper member is missing; in the ½ elliptic, simply the lower portion is used. The cantilever type appears to be the ½ elliptic turned upside down. Transverse types are usually of the ½ elliptic type placed across the rear of the car. The platform type has the ¾ elliptic on the sides and another transversely mounted and con-nected with the side members.

Tabular Arrangement and Special Notes -Cars on the pages following are divided into six classes, viz.: 4-cylinder cars, 6cylinder cars, 8-cylinder cars, 12-cylinder cars, constituting the gasoline car sec-tions, electric cars and steam cars. Under these heads, in the order given, the cars are arranged in alphabetical order. A single tire size indicates the same sized tire front and rear. Prices: The price quoted in the third line of each specifica tion is usually for the touring car model, unless otherwise indicated.









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Index of 1918 Cars, Body Styles and Prices

Gasoline Passenger Cars Listed Alphabetically According to Manufacturers' Names, with Index to Chassis Specifications

Abbott Corp., Cleveland, O. ABBOTT-DETROIT CHASSIS, Pg. 34	6-40 Convertible Sedan \$ 5 1795	Chevrolet Motor Co., New York City.
ABBOTT-DETROIT CHASSIS, Pg. 34	6-40 Roadster	CHEVROLET CHASSIS, Pg. 20-31-29
		Model Body Cyl. Pas. Price
Model Body Cyl Pas. Price	Bell Motor Car Co., York, Pa. BELL CHASSIS Pg. 30	Four-Ninety Touring4 5 \$635
6-44 Touring 6 7 \$1295	BELL CHASSIS, Pg. 30 Model Body Cyl Pas Price	Four-Ninety Roadster 4 2 620
6-60 Touring 7 1595		Four-Ninety Sedan or Coupe 4 6-2 1060
The Allen Motor Co., Fontorin, O. ALLEN CHASSIS, Pg. 30-37		FA Touring4 5 Fill
	Biddle Motor Car Co., Philadelphia, Pa.	FA Roadster4 2 935
Model Body Cyl. Pas. Price	BIDDLE CHASSIS, Pg. 30 Model Body Cyl. Pms. Price	FA Sedan 5 1475
41 Touring 4 5 \$1095		Eight Cyl. Touring 8 5 1385
41 Roadster 4 1025		Eight Cly. Roadster8 4 1385
41 Sedan 4 5 1895	Birch Motor Cars, Chicago, Ill.	Cole Motor Car Co., Indianapolia, Ind. COLE EIGHT CHASSIS, Pg. 39
American Motors Corp., Plainfield, N. J.	BIRCH CHASSIS, Pg. 30-34	COLE EIGHT CHASSIS, Pg 39 Model Body Cyl. Pas Price
AMERICAN-SIX CHASSIS Pg. 31-34	Model Body Cyl Pas. Price	860 Touring
Model Body Cyl. Pas. Price	Super Four Touring 4 5 \$895	S61 Tuxedo Foursome8 4 1995
R Touring	Super-Four Chummy Road. 4 4 996	863 Tourcoupe
E Cloverleaf 6 4 1465	Light Six Touring 5 1055	864 4-Door Toursedan 8 7 2695
15 Speedster 6 2 1465	Brewster & Co., Queensboro B. P., L. L. C.	865 4-Door Toursedan 8 7 2595
Anderson Motor Co., Ruck Hill, S. C.	BREWSTER CHASSIS, Pg 30 Model Body Cyl Pas. Price	866 4-Door Toursedan 8 8 2795
ANDERSON 6-40 CHASSIS Pg. 34 Model Body Cyl Pas Price		870 Tourster \$ 7 2395
Model Body Cyl Pas Price	1 Chassis \$5500	871 Roadster 8 2 2395
6-40 Touring 6 6 \$1435	Brewster Town Bghm 4 2 8300	872 Sporster 8 4 2395
Apperson Brothers Auto Co., Kokomo, Ind.	I Brewster Coun Bghm. t 4 8300	Columbia Wotors Co., Detroit. Wich.
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8-18-7 Touring	1 Brewster L. T. Land 4 8500	A Touring 5 \$1350
9-18-4 Roadster 8 4 2550	1 Brewster Tour. Land. 4 8800	B Sport model # 4 1495
9-18-7 Touring 7 3:00	1 Brewster Limousine4 4 8500	Comet Automobile Co., Decatur. Ill.
8-18-7 Touring 7 3400	1 Brewster En. Drive4 6 8400	COMET CHARGE Pro 95
Auburn Automobile Co., Auburn. Ind.	1 Brewster Touring 4 7700	Model Body Cyl. Pas. Price Centennial Touring
AUBURN CHASSIS, Pg 30-34	1 Brewster Runahout 4 2-4 7200	Centennial Touring 6 5 \$1295
Model Body Cyl Pas. Price	Briscoe Motor Corp., Jackson. Mich.	Commonwealth Motors Co., Chiengo, Ill.
6-39-B Touring 6 5 \$1845	BRISCOE CHASSIS, Pu 20 Model Body Cvl. Pas. Price	COM WEALTH U -4-F. CHASSIS, Pg. 30
6-39-B Convertible Sedan 5 1545		Model Body Cvl Pas, Price
6-39-E Chummy Roadster 5 4 1345	Four-B24 Touring 5 \$725	"Ultra-4-Forty" Touring4 5 \$995
6-39-E Chummy Coupe 6 4 1495	Four-R24 Roadster 4 4 725	"Ultra-4-Forty" Chum. Rd. 4 6 995
6-39-S Sport 8 4 1395	Four-B24 Runabout	Cortland Cart & Car, Co., Sidney, N. Y.
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6-44 Convertible Sedan 7 1985	BUICK CHASSIS, Pg. 34	Model Body Cyl. Pas Price
6-44 Sedan 6 7 2450	Model Body Cyl. Pas. Price E-34 Touring 4 5 \$880	A Touring 4 5 \$1080*
Austin Automobile Co., G. Ranids, Wich.		H Roadster 4 2 950
AUSTIN CHASSIS, Pg. 34-40	E-45 Touring 6 5 1261	C Roadster 4 1090
Model Body Cvl Pas Price		C Roadster De Luxe4 6 1790
36-66 Touring 6 5-6 \$3400		B Speedster 4 2 950
36-86 Roadster 5 2-4 3400	O	T Suburban 4 5 875
48-68 Touring 6 5-6 4200	Cadillac Motor Car Co., Detroit, Mich.	*Includes War Tax
		Cenwford Auto. Co., Hazerstown, Md.
4R-66 Rondster 6 2-4 4200	CHASSIS PE, ABSAS	
1919 Touring	CADILLAC CHASSIS Pc. 25-39 Wodel Body Cvl. Pas Peter	CRAWFORD CHASSIS Pg 35
1919 Touring	87 Touring	CRAWFORD CHASSIS Pg 35 Model Body Cyl. Pas Price
1919 Touring	57 Touring	CRAWFORD CHASSIS Pg 35 Model Rody Cyl. Pas Price 18-6-40 Touring
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1918 Touring	## Touring	Crow-Elkhard Weter Car Co. Elkhard Indicated Crow-Elkhard Weter Car Co. Elkhard Indicated Crow-Elkhard Chassis Dr. 20 Model Rody Cvl. Pas Prince C E. Touring de luxe. 4 5 985 C E. Touring de luxe. 4 5 985 C E. Convertible sedan 4 1975 C E. Clovert af 4 995 J. Cunsingham Son & Co., Rochester, N. Y. Clenningham Son & Co., Rochester, N. Y. Clenningham Chassis Pr. 39 World Rody Cyl. Pas Price V. Touring 9 7 84856 V. Closed 9 5500 V. Limousine 8 5500 V. Limousine 8 5500 V. Touring 8 6 4750 V. Touring 8 6 4750 V. Roadster 9 4 4750 V. Roadster 9 4 4750 V. Inside Drive Limousine 8 6 6000 V. Town Car 8 6 6000 V. To
1918 Touring	### ##################################	Crow-Elkhard Weter Car Co. Elkhard Ind CROW-El Ethart CHASSIS Pr. 26
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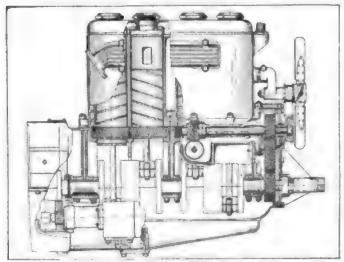
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	Series 9 Sedan	349 Flyer
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Coupe 1 1350	6 A 45 Rondster 6 4 1450	1918 Touring 6 7 \$1995
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11 Touring 4 5	G Touring 6 8 \$1055	EE Sedan 8 7
11 9 Gedan 4 5	G Roadster 6 3 1055	EE Foursome 8 4
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DOUGLAS EIGHT CHASSIS, Pg. 32 Model Body Cvl Pas Price	HACKETT CHASSIS, Pg. 21 Model Body Cvl Pag, Price	100 Point 6 Sedan 5 1735
G 5 Touring 8 5 \$2000	Model Body Cvl Pas, Price 5 \$960	100 point 6 Roadster 6 3 1295
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G1 Club Roadster 4 2000 G1 Standard Roadster 5 8 2000		100 point 6 Coupe 6 4 1735 100 point 6 Victoria 6 5 2050
	Hal Motor Car Co., Cleveland, O. HAL-TWELVE CHASSIS, Pg. 40	100 point 6 Sedaniet 6 4 1885
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1e1 -40 -40 -40 0 0 -40 -42 -42 -42	Roadster 6 Touring 6 Club Roadster 6 Coupe 6 Redan 6 Demountable 6 Roadster 6 Club Roadster 6 Touring 6 Touring 6 Sedan 6	\$ \$1250 5 1250 5 1280 3 1850 6 1950 5 1550 5 1550 5 1550 7 1525 7 2275	Touring Company Comp	28-C-4 F 38-C-4 C 28-C-4 T 38-C-4 T 38-C-4 E 38-C-4 E 38-C-4 E 38-C-4 E	oupe	2 5700 8 5700 4 4800 8 4800 5900 5900 5100
1e1 -40 -40 0 0 -40 -42 -42 -42 -42	Roadster 6 Touring 6 Club Roadster 6 Coupe 6 Redan 6 Demountable 6 Roadster 6 Club Roadster 6 Touring 6 Touring 6 Sedan 6 Club Sedan 6	\$ \$1250 5 1250 5 1280 3 1250 5 1250 5 1550 5 1550 5 1660 5 1610 7 1523 7 2275 5 2175	Touring Company Comp	88-C-4 F 38-C-4 C 28-C-4 T 38-C-4 T 38-C-4 F 38-C-4 F 38-C-4 V 28-C-4 V 28-C-4 V 28-C-4 V	oupe	2 5700 3 5700 4 4800 5 4800 5 5900 5 5900 5 100 5 100 5 100
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40 -40 -40 0 0 0 -40 -42 -42 -42	Roadster 6 Touring 6 Club Roadster 6 Coupe 6 Redan 6 Demountable 6 Roadster 6 Club Roadster 6 Touring 6 Touring 6 Cub Sedan 6 Cabriolet 6 Coupe 6 Limousine 7 Town car 6	\$ \$1250 5 1250 5 1280 3 1850 5 1950 5 1550 2 1490 5 1660 5 1610 7 1523 7 2275 5 2185 4 1960 4 2135 7 2850 7 2850	Touring Compared	88-C-4 F 38-C-4 C 28-C-4 T 38-C-4 T 38-C-4 E 38-C-4 E 38-C-4 E 38-C-4 V 28-C-4 V 28-C-4 T 38-C-4 T	oupe 6 oupe 6 ouring 16	2 5700 8 5700 4 4800 5 5900 5 5900 5 5900 6 100 6 100
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de! 1-40 5-40 4-40 40 40 65-40 1-42 5-42 1-42	Roadster 6 Touring 6 Club Roadster 6 Coupe 6 Redan 6 Demountable 6 Roadster 6 Club Roadster 6 Club Roadster 6 Touring 7 Touring 6 Sedan 6 Cub Sedan 6 Cabriolet 6 Coupe 6 Limousine 7 Town car 6 De Luxe Sedan 6 Demountable 6 Automobile Co., East 8 E-KNIGHT CHAS Body Cyl. Roadster 6 Touring 6 Roadster 6	\$ \$1250 5 1250 5 1280 3 1850 5 1950 5 1550 5 1550 5 1560 5 1560 6 1510 7 1525 7 2275 6 2185 4 1960 4 2135 7 2850 7 2850 7 3425 7 1825 **Tolima, 311. **Sis, Pg. 32.	Touring	28-C-4 F 38-C-4 T 28-C-4 T 28-C-4 T 38-C-4 E 38-C-4 E 38-C-4 E 28-C-4 E 28-C-4 F 28-C-4 F 28-C-4 F 28-C-4 F 48-B-4 C 48-B-4 F 48-B-4 C 48-B-4 F	oupe oupe oupe ouring ouring ouring sirougham andaulet edan festibule Brougham festibule Broughaulet festibule Fandaulet festibule Fandaulet festibule Fandaulet festibule Fandaulet festibule Fandaulet festibule Brougham festibule Fandaulet festibule Brougham french Broug-Land fown Brougham fown	2 5700 8 5700 6 48000 6 5900 5900 6 5100 6 6 5100 6
	Roadster Touring Club Roadster Coupe Redan Demountable Roadster Club Roadster Club Roadster Touring Sedan Club Roadster Touring Limousine Town car De Luxe Sedan Demountable Automobile B-KNIGHT CHAS Roadster Touring Roadster Touring Cyl. Roadster Touring Roadster Touring Club Redan Cabrille Coupe	\$ \$1250 5 1250 5 1250 3 1850 6 1950 5 1550 2 1490 5 1560 7 1523 7 2275 6 2185 4 1960 4 2135 7 2850 7 2850 7 2850 7 2850 7 2850 7 2850 7 2850 8 1610 8 1650 4 51650 4 1986	Touring	28-C-4 F 38-C-4 C 28-C-4 T 38-C-4 F 38-C-4 E 38-C-4 E 38-C-4 V 28-C-4 V 28-C-4 V 28-C-4 F 38-C-4 F 38-C-4 F 48-B-4 F 48-B-4 F 48-B-4 F 48-B-4 F	oupe 5 oupe 6 oupe 6 ouring 6 ouring 6 inougham 6 andaulet 6 edan 6 estibule Brougham 6 rougham-Landaulet 6 estibule Landaulet 6 estibule Landaulet 6 estibule Froug-Land 6 rench Broug-Land 6 rench Broug-Land 6 own Brougham 6 oupe 6 oupe 6 ouring 6	2 5700 3 5700 4 4800 8 4800 5 5900 5 100 5 100 6 10

	Shadhayara Damblad Mataus Co. 43ht	
48-B-4 Suburban	Shudbourne Combined Motors Co., Chi- engo, 11L	Watson & Storckel, New York.
18-B-4 Suburban Landau6 6800	BOUR-DAVIS CHASSIS, Pg. 24	KNIGHT SPECIAL CHASSIS, Pr. 31
48-B-4 Vestibule Suburban 7000	atodel Budy Cyt. Pan. Price 18-B Touring 5 5 41650	Model Body Cyl. Pas, Price B Chassis \$5000
48-B-4 Vestibule Landau6 7000	Standard Steel Car Co., Pittsburgh, Pa.	B Chassis
48-B-4 Vest. Suburban Land.6 7000	STANDARD CHABSIS, Pg. 4	WESTCOTT CHASSIS, Pg. 39
49-B-4 Roadster 6 4 5400	Model Body Cyl. Pas. Pric.	Model Body Cyl. Pas. Price
48-B-4 Convertible Roadster \$400	G Touring 8 7 \$2450	18 Touring 6 7-5 \$1940
66-A-4 Runabout	G Roadster 8 4 2460	18 Roadster 4 1890
66-A-4 Runabout	G Sedan \$ 7 3500	18 Sedan, convertible 6 7-6 2790 18 Coupe, convertible 6 4 2790
66-A-4 Coupe	G Limousine 7 4000	18 Sportster 6 5 2290
66-A-4 Touring 6 4 6400	G Coupe 8 \$ 3600	The White Co., Cleveland, O.
66-A-4 Touring	The F. M. Stearns Co., Cleveland, O.	WHITE CHASSIS, Pg. 13
66-A-4 Touring	STEARNS-KNIGHT CHASSIS, Fg. 33-40 Model Body Cyl. Pag. Price	Model Body Cyl. Pas. Price
66-A-4 Suburban	S. K. L. 4 Touring 4 6 \$1786	G. M Chassis
66-A-4 Suburban Landau6 7800	S. K. L. 4 Roudster 4 1786	G. M. Touring
66-A-4 Vestibule Suburban6 8000	S. K. L. 4 Coupe 4 2400	G. M. Landaulet 4 7 6200
66-A-4 Vestibule Landau6 8000 66-A-4 Vestibule Brougham.6 7800	S. K. L. 4 Limousine	G. M. Cabriolet 7 6400
66-A-4 Vest, Suburban-Land.6 8000	S. K. L. 4 Landaulet 7 2800	G. M. T. Chassis
66-A-4 Roadster 4 6400	B. K. L. 4 Landaulet Bghm 4 7 3860	G. M. T. Runabout
66-A-4 Convertible Roadster.6 7400	S. K. L. 4 Springfield C. Sed. 4 7 2035	G. M. T. Town car Landaulet 4 6 6050
Pilgrim Motor Car Co., Detroit, Mich. PILGRIM CHASSIS, Pg. 23	S. K. L. 4 Chassis	G. M. T. Sedan 4 4 6050
PILORIM CHASSIS, Pg. 23 Model - Body Cyl. Pan. Price	S. K. 8 Touring 8 7 2576	G. M. T. Coupe \$ 6050
37 Touring 6 \$896	S. K. 8 Roadster 8 4 2575	Willys-Overland Co., Toledo, O.
37 Roadster 4 4 895	S. K. 8 Coupe 4 \$200	OVERLAND CHASSIS, Pg. 32-37 Model Body Cyl. Pas. Prive
Pilot Meter Car Co., Richmond, Ind. PILOT CHASSIS, Pg. 38	S. K. 8 Coupe Landaulet 8 4 3200 S. K. 8 Limousine 8 7 \$875	Country Club Roadster 4 \$840
PILOT CHASSIS, Pg. 28 Model Body Cyl. Pag. Price	S. K. 8 Limousine Bghm. 8 7 3876	90 Touring Car. 4 796
6-45 Touring 6 5 \$1295	S. K. 8 Landaulet 7 3985	90 Roadster 780
6-45 Roadster 6 4 1295	S. K. 8 Landaulet Bghm. 8 7 2986	90 Sedan 1240 85-4 Touring 4 5 920
6-45 Demountable Sedun 5 1520 6-45 Demountable Coupe 6 4 1520	S. K. 8 Chassis	85-4 Touring 4 5 930 85-4 Roadster 4 7 915
F. R. Porter Co., Port Jewerson, N. Y.	Stephens Motor Branch Moline Plow, Mo-	85-6 Touring 6 5 1130
F. R. P. CHASSIS, Pg. 31	STEPHENS-SIX CHASSIS, Pg. 25	85-6 Tour. Sedan6 5 1620
Model Body Cyl. Pas. Price	Model Body Cyl. Pas. Price	WILLYS-KNIGHT CHASSIS Pg. 22-40
45-A Touring Chassis 4 7 \$7000	70 Roadster \$ \$1486	WILLYS-KNIGHT CHASSIS, Pg. 33-40 58-4 Touring 7 1525
45-B Tour. Chassis	74 Roadster	88-4 Coupe 4 2175
PREMIER CHASSIS, Pg. 38	75 Roudster 6 5 1485 78 Sedan 6 5 1985	88-8 2000
Model Body Cyl. Pas. Pric	The Studebaker Corporation of America,	88-8 Tour. Sedan
6-C Touring 7 \$2285	South Bend, Ind.	58-8 Limousine 8 2800 88-8 Town car 8 2800
6-C Roadster	STUDEBAKER CHASSIS, Pg. 33-39-41	WILLYS-SIX CHASSIS, Pg. 37
Princess Motor Car Corp., Detroit, Mich.	Model Body Cyl. Pas. Price	89-6 - Touring 6 7 1525
PRINCERS CHASSIS Pr. 33	S. H. Touring	89-6 Sedan 6 1045
Model Body Cyl. Pas. Price	S. H. Sedan	Winton Co., Cleveland, O.
4-36 Touring	E. H. Touring 6 5	WINTON CHASSIS, Pg. 39 Model Body Cyl. Pag. Price
1-16 Speedster 1 2 825	E. H. Roadster 8 2	Model Body Cyl. Pas. Price 33 Touring
R	E. H. Sedan	33 Touring 6 5 2900
Regal Motor Car Co., Detroit, Mich.	E. Q. Touring 6 7	48 Touring 7 \$500
REGAL Model Body Cyl. Pas. Price	E. G. Sedan 7	Wolvertur Motor Car Co., Kalamasco, Mich.
J Touring 4 5 \$795	Stuta Motor Car Co., Indianapolis, Ind.	WOLVERINE CHASSIS, Pg. 13 Model Body Cyl. Pag. Price
Reo Motor Car Co., Lausing, Mich.	STUTZ CHASSIS, Pg. 33-36	Model Body Cyl. Pas. Price Speedway Special Rondster, 4 2 \$3500
REO CHASSIS, Pg. 33-38	Model Body Cyl. Pas. Price S-400 Speedster	Sport Touring. 4 4 3750
Model Body Cyl. Pas. Price R Touring 4 5 \$985	S-400 Speedster	Wooda Mutor Vehicle Co., Chicago, Ill.
R Rondster 4 2 986	8-400 Close Couple4 4 2650	WOODS DUAL POWER CHASSIS, Pg. 14
M Touring 7 1386	8-400 Touring 6-7 2760	Model Body Cyl. Pag. Price
N Roadster 4 1385	T	54 Coupe 4 \$ \$2950
Saginaw Motor Car Co., Saginaw, Mich.	The Templar Motors Corp., Cleveland, O. TEMPLAR CHASSIS, Pg. 32	•
YALE EIGHT CHASSIS, Pg. 40	Model Body Cyl. Pas. Price	ELECTRIC CARC
Model Body Cyl. Pas. Price	445 Roadster 2 \$2265	ELECTRIC CARS
M Touring	445 Victoria 4 2165	A
M-S Speedster 8 4 1950	445 Touring	Anderson Electric Car Co., Detroit, Mich.
Saxon Motor Car Co., Detroit, Mich.	Traverse City Motor Car Co., Traverse	DETROIT ELECTRIC CHASSIS, Pg. 41
SAXON CHASSIS, Pg. 33-38	City, Mich.	Model Body Pun. Price
Model Body Cyl. Pas P B-5-R Roadster	NAPOLEON CHASSIS, 1'g. 33-87	71 Brougham
S-4-T Touring	Model Body Cyl. Pas. Price	78 Brougham
S-4-R Roadster, chummy6 3 935	18-35 Chummy 4 \$1085 18-36 Streamline Pleasure 4 5 1085	74 Brougham
S-4-8 Sedan 5 5 1395	18-38 Closed Delivery4 . 1040	76 Brougham 4 2276
SAVERS CHASSIS, Pg. 28	18-39 Pleasure 5 1285	76 Roadster
Model Body Cyl. Pas. Pric	Trumbull Motor Car Can Philadelphia, Pa.	Baken R A L Co Cleveland O
Light Six Touring 5 \$ \$1295	TRUMBULL CHASSIS, Pg. 33	Baker R. & L. Co., Cleveland, O. RAUCH & LANG CHASSIS, Pg. 41
Serings-Booth Corn., Detroit, Mich.	Model Body Cyl. Pas. Price	Model Body Pas. Price
SCRIPPS-BOOTH CHASSIS, Pg. 38 Model Body Cyl. Pas. Price	16 B Coupe	BX Brougham \$3000
Rix 39 Touring	V	J Coach 5 3200
Six 40 Roadster f 3 1425	Velle Motorn Corp., Moline, Ill.	The Fritchie Co., Denver, Col.
H Four Passenger8 4 1585	VELIE-BILTWEL CHASSIS, Pg. 39 Model Body Cyl. Pas. Price	FRITCHLE CHASSIS, Pg. 41
SENECA Motor Car Co., Fontoria, O. SENECA CHASSIS, Pg. 23	38 Touring 5 \$ \$1840	Model Budy Pas. Price
Model Body Cyl. Pas. Pric	28 Roadster 6 4 1840	Colonial Broughum 5 \$2600
D Five Passenger Open. 4 5 \$850	38 Roadster 6 2 1360	Colonial Coupe 4 32011
E Four-Passenger Road.4 4 900	35 Cabriolet	Hupp-Yeats Electric Car Co., Detroit, Mich.
F Light Delivery, 4 \$25 Singer Motor Co., Inc., New York City.	38 Cabriolet	HUPP-YEATS CHASSIS, Pg. 41 Model Body Pag Price
SINGER CHASSIS, Pg. 38		
		A D
Model Body Cyl. Pas. Price	39 Touring 7 1595	4 Regent B Coupe 4 \$1750
		4 Regent B Coupe







Sectional Side View of American Siesve-Valve Motor, the Cylinders and Crank Case Being Cut Away to Show the Construction.

three compression rings each and cut with oil grooves. The crankshaft is a special type, with webs cut at right angles to the centre line of the shaft, with heavy counterweights between the first and second and the third and fourth crankplus. The form of the crankshaft may be noted in the drawing of the side section and the illustration of the parts. The connecting rods are the usual I section type, the caps being each retained by four bolts, and the wristpins are conventional, oscillating in the piston bosses and being clamped in the small ends of the connecting rods by bolts.

At the forward end of the crank case is, the gearset, this consisting of spiral cut gears, that on the crankshaft driving an idler, which in turn drives the gear on the shaft that drives the sleeves and the water pumps, and with which the oiling system pump is coupled. By removing the gearset cover the gears are accessible, and the main and connecting rod bearings can be reached by dropping the lower section of the crank case.

The timing of the engine is decidedly interesting. Examination of the side section drawing will show that the gears at the bases of the cylinder sleeves are helical, and the second and third sleeve gears are driven by the pinions on the timing shaft. As the gears of the first and second and the third and fourth sleeves mesh, the No. 2 sleeve will revolve from left to right and the No. 1 sleeve from right to left, and the No. 3 sleeve will revolve from right to left and the No. 4 sleeve from left to right; or, to express the result in another way, the sleeves of each pair of cylinders will revolve in opposite directions.

The timing is by turning each sleeve 45 degrees of its circumference for each piston stroke, so that, for instance, the aleeve will turn one-eighth of its external area with each stroke of the piston. The first or suction stroke begins as the port on the intake side of the sleeve is passing the intake manifold port. The compression stroke begins after the port is closed, when the sleeve makes the second of the series of eighth turns. The cylinder is fired as the sleeve begins the third eighth turn of the revolution, and the port reaches the exhaust side of the engine and begins to open with the fourth or last stroke of the cycle. The exhaust port is closed with the completion of the fourth piston stroke and the cycle is begun anew with the other side of the sleeve. The sleeve makes one revolution for each four turns of the crankshaft, and the engineering description of the timing is "four to one, with two ports."

The timing can be mechanically perfect in the sense that it is not dependent upon valve stem length or tappet adjustment, nor upon spring tension, and there is no possibility of wear that must be compensated by adjusting. Nothing can prevent the positive closing of the ports as the sleeves revolve, which can be contrasted with valves not seating from carbon deposits, from warped valve heads, from sticking guides, from worn seats, or having variable agtion because

of weakened springs. There is no necessity of valve grinding to insure compression and there can be no dilution of mixture from worn valve guides.

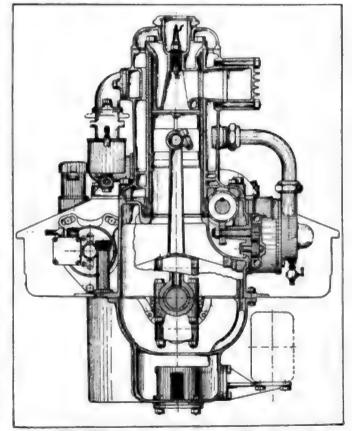
The engine is cooled by a circulation of water through the jackets forced by a centrifugal pump, and the water inlet manifold is under the exhaust manifold, while the outlet manifold is at the forward end of the block, there being nothing to prevent quick removal of the water jacket head or cover. The lubricant is drawn from a screened well in the reservoir and forced through ducts to the main and sleeve gear shaft bearings, and to the tops of the cylinders, and it is evenly distributed by spiral sleeve grooves, so that there is a uniform film of oil between the sleeves and the cylinder walls. Statement is made that there is no uncertainty as to lubrication, which obviates the variability of lubricating the V type engine. The oil thrown off by the centrifugal movement of the crankshaft and the splash thoroughly lubricates the internal walls of the sleeves, the pistons, the wristpins and the forward gearset and the sleeve gears are lubricated by the drainage from the forward main bearing and the sleeves.

Tests made with an engine having cylinder bore of four inches and stroke of five inches, which has a horsepower rating of 25.60 by the S. A. E. formula, which is obtained at 1200 revolutions a minute, show the following:

R	levolutions	
1	Per Minute	Horsepower
	400	4.96
	600	10.20
	800	20,80
	1300	48.68
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The same motor ran continuously at 3600 revolutions per minute and delivered a horsepower output nearly double this with very little vibration at any speed within the entire range of speeds and loads tested.

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Sectional End View of American Sieeve-Valve Motor, Showing the Design of the Cylinder Head and the Sieeve Driving Shaft.







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should be partially covered in extremely cold weather. If a temperature indicating device is fitted to the radiator filler cap, care should be taken that the temperature does not rise above 190 degrees. The radiator may be covered so as to keep the temperature as near this figure as possible. Too much radiator area causes the engine to skip, a loss of power and reduces the efficiency of combustion as well as requires more gasoline.

A cold engine condenses the fuel and permits the raw gasoline to enter the cylinders and run down past the rings into the crank case, diluting the lubricant and reducing its efficiency, thereby causing depreciation of the whole engine.

With the advent of the high speed engine it is none too easy to maintain a film of oil within the cylinder under the best of conditions, and this reduction of the lubricant by raw fuel presents a serious problem, unless extreme care is exercised.

Many engines now on the market are fitted with devices for controlling the circulating area, or for controlling the water circulation. These devices are set to keep the temperature between 150 and 190 degrees as far as possible. This range of temperature, being an ideal one, so to speak, may be closely followed when fitting devices to the engine.

AN EASY METHOD FOR STARTING.

(W. S. Leach, Taunton, Mass.)

Second Best Letter.

Perhaps the easiest method of starting an engine in cold weather and one that is cheap as well as effective is as follows:

Saturate a small sponge with ether and place it in the carburetor air intake, then start the engine in the usual way. I have found this method to be superior to many that I have tried. The fumes from the ether are very explosive and furnish enough vapor for three or four explosions. By that time the manifold will be sufficiently warmed to permit the engine to run on the regular fuel.

After the engine has been started the sponge should be removed. If the carburetor is fitted with a hot air pipe the pipe may be removed before inserting the sponge.

VARIANCE OF COMPRESSION IN CYLINDERS.

(T. K., Dorchester, Mass.)

My Ford car 1912 does not run as well as I think it should. It lacks power. Can you tell me how to replace the valve bushings and how to determine when this is necessary? Three of the cylinders show a compression of 40 pounds per square inch while the other shows 60. What shall I do to remedy this trouble? Would you advise me to fit a hot air stove to the carbureter, or will the present equipment be all right?

There is evidently some trouble with either the piston or explosion chamber in your engine, for there should not be such a variance of compression between the three cylinders and the fourth. We would advise you to make a series of measurements of both the nistons and cylinder head to determine the reason for this difference. First place a straight edge across the planed edge of the cylinder head, then measure the depth of the explosion chamber. Make a rough sketch of each one, taking measurements at the sides and middle, and commare them. If you have a defective casting possibly one of the explosion chambers will not be as large as the others thereby increasing the compression in that particular cylinder.

It may be that one of the nistons extends into the explosion chamber farther than the others. With the head removed from the cylinder block bring two of the pistons to the top of their stroke and measure the distance they extend above the block. Make comparisons with the others and should one of them extend more than the others, it should be replaced with new.

The varce stem guides in this model may be driven out by using an iron rod, slightly larger than the valve stem, placing it against the bushing through the top of the block and driving with a hammer. In putting the new ones in place besure to drive against them with a block of wood or the edges



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THE HUDSON SUPER-SIX. (Continued from Page 48.)

splash. From the oil base oil is pumped by a plunger arrangement mounted on the distributor unit to the front compartment containing the timing gears and from thence into the trough beneath number one connecting rod.

As the crankshaft revolves the connecting rod splashes the oil from this trough into a gutter mounted on the side of the crank case, which in turn feeds number two connecting rod trough. From this trough the oil is splashed to a second gutter and thence falls to the third trough, and so on until all of the troughs are filled, the surplus oil running back into the reservoir.

Following the Oil Distribution.

Part of the oil splashed from the connecting rods is distributed through a second set of troughs to the main bearings, while the rest of the splash or mist provides lubrication for the cylinders, wrist pins and cams.

To increase the supply of oil at high speeds the pump is fitted with a connection to the throttle rod, which, through an eccentric and cam arrangement, increases the pump plunger stroke with the opening of the throttle and the consequent increase of engine speed.

The oil pump, as well as the Delco distributor unit, are driven by the same shaft from the pump driving gear. To disassemble it, first remove the distributor and breaker box unit, which is fastened to the pump housing by four cap screws. With the screws removed the timer unit may be lifted off and the two pump housing cap screws taken out, permitting the removal of the pump unit from the crank case.

All of the oil tubes, as well as the pump itself, should be given a thorough cleaning and rinsed with kerosene oil. A flexible copper wire may be used for cleaning the tubes. When the pump has been replaced and before the engine is started the pump should be primed with oil through the priming cup provided for that purpose, or through the plug in the side of the pump. In a newly overhauled engine it is important that the oiling system become operative immediately upon the starting of the engine and for this reason the oil troughs should be filled with oil before the oil base or reservoir is replaced.

The next step in the overhaul is the removal of the timing gear case. Before this can be done the large right hand threaded nut which fastens the fan belt pulley to the crankshaft must be taken off. The fan belt pulley may then be pulled from the shaft, the timing case cover screws removed and the cover taken off, exposing the timing and pump gears.

Next remove the nut on the end of the pump shaft and pull off the pump gear. Then disconnect the pump from the generator shaft by removing the coupling bolts, and remove the pump housing retaining screws. The pump may then be taken from the crank case. With the pump will be taken the pump shaft front bearing, which is mounted in the front of the timing gear case together with the timing unit drive gear.

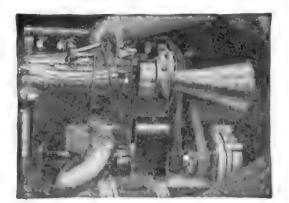
Disassembly of Pump Unit.

Complete disassembly of the pump unit is accomplished as follows: Remove the taper pin and pull of the pump shaft coupling, then unbolt and separate the two parts of the pump housing. The pump impellor is retained by a taper pin and key and must next be taken from the shaft, permitting the removal of the front pump housing and the front bearing housing. The taper pin may then be driven from the timer gear and that gear pulled from the shaft, completing the disassembly.

With the complete unit installed on the engine there should be not over 1/64 end play in the pump shaft. Excessive play is removed by inserting shims between the timer gear and the front pump bearing in the timer gear case.

The latter bearing may be removed from the front of the engine after the four retaining cap screws have been taken out. In replacing the pump impellor blade be sure to have the blades replaced in the proper direction of rotation or the pump will remain inoperative.

With the front of the timing gear case removed the camshaft may be pulled from the engine. Before taking out the camshaft, however, the push rods should be wired or tied at their topmost point so that they will not interfere with the cams as the shaft is drawn forth.



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After the camshaft has been taken out the push rods may be removed from the inside of the engine and the push rod guides driven out from the inside, providing inspection shows the necessity of replacement of these parts.

If the cylinders are to be removed from the engine the exhaust manifold should first be disconnected at the coupling, then the retaining cap screws taken out and the manifold removed. The carburetor should next be taken off and the cylinder block cap screws removed, permitting the lifting off of the entire block.

Disassembly of Power Unit.

The engine is suspended at four points and boited to the trame by two boits at the rear and one in the front on each side. This unit should not be removed from the chassis until the transmission has been taken from it.

In removing the transmission from the engine, first disconnect the control rods and the universal joint and remove the gear change and emergency lever mounting from the top of the transmission. Then remove the bolts and cap screws which fasten the bell housing of the gearset to the flywheel housing, leaving the extreme top bolt tightened in position. After sufficient help has been obtained to insure proper management of this unit, unscrew the nut from the top bolt and draw the transmission back from the engine unit in an absolutely straight line until the pilot shaft has cleared the engine. To insure lining up of this unit while being removed the top bolt should be left in place, acting as a guide. If proper precautions are not taken there is great danger of straining or bending the pilot shaft.

The clutch unit is contained in the flywheel and when the clutch pedal is depressed the spring tension is taken by the pedal arm or fork. Press down on the pedal and remove the 12 cap screws which fasten the clutch cover to the flywheel. Upon the release of the pedal the cover will be forced off and the clutch discs out until the clutch spring expands to the length of the clutch spring bolt, when it will cease to exert pressure on the discs. The pedal may then be unbolted and the entire clutch assembly slipped from the flywheel. Under no conditions should the nut be taken from the clutch spring bolt, unless the spring is compressed beneath an arbor press, since the spring exerts a pressure of many

hundred pounds.

Overhaul of Clutch Units.

Between each pair of driving discs, which are mounted on the four steel studs in the flywheel, are small springs. The purpose of these springs is to expand the clutch discs as the clutch spring pressure is removed and permit the driven cork faced discs to rotate between the driving discs freely.

In assembling the clutch great care must be exercised or these little springs will slip out of place and becoming jammed between the revolving parts, cause the clutch to drag

instead of releasing properly.

When the clutch unit is to be assembled ready for inserting in the flywheel, the clutch drum should be placed on the bench and a cork insert disc placed over it, then a plain disc, then a cork insert disc and so on until all of the discs have been put on the drum. After all of the clutch discs have thus been assembled the assembly should be slowly slipped on the studs of the clutch cover, and as it is slipped on the studs a small spring should be placed on the studs between each pair of driving discs. The spring, ball thrust bearings and shims are then placed in the crankshaft and the clutch unit put into place. The cap screws fastening the clutch cover to the flywheel are usually sufficiently long to compress the clutch spring.

Where it is desired to increase the clutch spring tension, thin washers or shims are placed in the crankshaft before the spring is put into place. If the spring is too long to permit the catching of the clutch cover cap screws, a lever may be used looped into a wire which is wound around the engine and forced against the jaws of the clutch to force the clutch cover against the flywheel and permit the catching of the cap screw threads.

Operations on the Transmission.

The disassembly of the transmission is a simple matter. The universal joint flange, which is retained by a lock nut and keyed to the shaft, is first removed. Then the bearing

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FOREIGN BUSINESS \$90,958,243.00

From National Automobile Chamber of Commerce, 7 East 42nd Street, New York, August 27, 1917

Embargoes Affect Motor Car Exports

Thirty-five Par Cent. Decrease in Shipments to Great Britian, France and Russia During Last Fiscal Year—Big Increases to All Other Countries—Shipments Total 80,811 Care, Valued at \$90,958,243—Thirty-three Hundred More Vehicles Exported, But Aggregate Value is \$6,507,000 Less—Few Trucks and More Passenger Care.

Figures just issued by the Department of Commerce show that during the 12 months ended June 30, 1917, the United States exported 80,811 automobiles and motor trucks, valued at \$90,958,243, as compared with 77,499 cars, valued at \$97,465,811 during the preceding fiscal year.

Analyzing the official figures, the National Automobile Chamber of Commerce finds that the increase in number of cars exported is due to the larger shipments to most countries outside of Europe, which more than offset the decreases in exports to Great Britain, France and Russia, due to import prohibitions and lack of shipping facilities.

The fact that the aggregate value of exports during the last fiscal year was less by \$6,507,000 than in the preceding year, while the actual number of vehicles exported was greater by 3312, is due to decreased shipments of trucks for war purposes, the average value of which is much higher than the average value of passenger cars exported to countries outside of Europe.

Exports of commercial vehicles and passenger carduring the two years were as follows:

1916 1917

 No.
 Value
 No.
 Value

 Commercial
 21,265
 \$56,805,548
 15,977
 \$42,337,315

 Passenger
 56,234
 40,660,263
 64,834
 48,620,928

Thus, while the number of trucks exported fell off 5288 in the year and their aggregate value was \$14.468.233 less, the shipments of passenger cars increased by 8600 and their value by \$7.960,665.

Great Britain and France were still our largest markets, despite their heavy falling off in purchases. The former bought \$18,508,442 worth last year, mostly trucks, as against \$26,147,232 worth in the previous fiscal year. France's imports were nearly all 'rucks and amounted to \$14,691,460, as compared with \$19,137, 904 in the 12 months ended June 30, 1916.

Owing to shipping difficulties and internal political

troubles, Russia's imports fell from a value of \$15,686,874 in 1916 to \$6,371,982 in the last fiscal year.

Exports to the rest of Europe combined increased remarkably, when it is remembered that no shipments went to the central empires. The increase amounted to more than \$1,000,000 in the year, accounted for largely by exports to the Scandinavian countries, Holland and Spain. Europe as a whole took slightly less than one-third by valuation of the total American exports.

Aside from the European countries, Canada is America's best customer for motor cars, having increased her jurchases by nearly \$4,200,000—from \$7,280,151 in 1916 to \$12,088,787 in 1917.

Next comes Asia and Oceania, with imports of 9716 cars, valued at \$10,093,720 last year—an increase of \$1,450,927. Australia follows, with 5000, valued at \$4,213,874. The British East Indies increased their purchases from \$2,307,739 to \$3,617,351.

In the Americas, after Canada, the West Indies were our best market for automobiles, to the extent of \$4,072,-647—an increase of \$1,248,735 over the year before.

The most remarkable increases, however, are shown by Mexico and the South American republics. Mexico's commercial recovery is reflected by an increase from \$409,700 to \$1,833,975 in the year. Argentina's imports reached nearly \$2,500,000. Brazil's trebled. Chile's prosperity from her nitrate mines resulted in an increase from \$576,777 to \$1,982,538. The rest of South America took automobiles to the value of \$1,804,827, as against only \$698,911 the year before.

In addition to automobiles the United States exported in the last fiscal year 23,435 automobile engines, valued at \$2.844.406; tires worth \$12,330,201 and parts worth \$27,284.932.

This makes a grand total of \$133,417,782 of foreign automobile business done by the country last year, which means a lot of money in the pockets of American workingmen.

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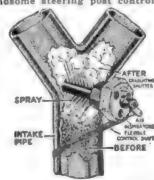
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Parts for any Automobile at a saving of 50% to 80%. Our three great plants cover every state in the Union, and we are therefore in better position to fill your orders.

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Regal 30, \$30-Overland 61, \$75. Flanders 20, \$50—Overland 67, \$75. E. M. F. 30, \$50—Overland 79, \$75. Rambier, Mod. 64, \$58-Overland 83, \$75 Selden 36 H. P., \$60-Overland 86-6, \$100 Cadillac 1909, \$60—Overland 90, \$125 Peerless 40, \$75—Case 1911, \$75 Henderson, 4 cyl., \$75—Moon 1913, \$75 Mitchell 5-1912, \$85—Stearns 1911, \$75 Speedwell 40 h.p., \$85—Velle 40 1912, \$85 Chalm'rs 6-1915, \$125—App'r'n 8-48, \$125 Velie 4-1915, \$125—Packard \$0, \$150 Packard 18, \$125—Apperson, 8 cyl., \$200 Menominee Truck Unit Plant, \$100 Abbott-Detroit 4-1913 Unit Plant, \$100 King 1914 Unit Plant, \$126. Chalmers 36-1912 Unit Plant, \$125 Abbott-Detroit 6-1915 Unit Plant, \$150 Oldsmobile 8 cyl. Unit Plant, \$200 Cadiliac 8 cyl. Unit Plant, \$300

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Strangling the Periodicals

Congress at its last session passed a hasty postal law increasing the postage on periodicals from FIFTY TO NINE HUNDRED PER CENT.

Some periodicals will be killed—all will be restricted in circulation and crippled. There will be fewer readers, and the habit of reading curtailed. The great function of periodicals is to assist in the spread of Ideas—by printing the achievements in the world of thought, culture and science.

Thus to shut out farm journals—as these zone rates will—will lessen the productive power of our country by millions of dollars through loss of better methods. Shut off trade journals and you decrease the manufacturing power by more millions. Shut off the religious papers and there are shut off channels that have raised millions of dollars for distressed humanity. Shut off the great periodicals of the home and there is throttled an avenue that has given expert instruction to hundreds of thousands of mothers and saved their babies to health and citizenship.

These national periodicals are printed in the big cities—and the first zone, the cheapest zone, is in or near those cities: there are many educational opportunities near cities, and the cities will read anyway. Small towns and distant districts depend to a large extent upon periodicals; thus this law increasing periodical postage where it is most needed shuts off opportunity where needed. It penalizes periodical readers.

Repeal this law. Repeal this FIFTY TO NINE HUNDRED PER CENT. periodical postage increase. Sign the petition below and mail it. Put a cross mark in the square—save the periodicals and the work that they have done and are doing for national education and patriotism.

SIGN BELOW

CUT OUT. MAIL TO CHARLES JOHNSON POST, ROOM 1417, 200 FIFTH AVENUE, NEW YORK CITY

PETITION TO CONGRESS—Sign Here!

The spread of education of culture, of scientific knowledge and advancement, and of our vast internal merchandising and manufacturing has been, and always is, vitally dependent upon the freest and cheapest circulation of periodicals. The penalties resulting from any restriction on the freest possible circulation of periodicals will be destructive of the best interests of our economic life and the opportunities of developing our best citizenship.

The postal amendment passed by the last Congress increasing the postage on periodicals from FIFTY TO NINE HUNDRED PER CENT, will throttle or destroy our periodicals at a time when the widest and most extensive circulation of publications is essential to the patriotism, education and upbuilding of our country.

Therefore, I the undersigned, do must carnestly demand the repeal of this burdensome periodical postage amendment,

Street Address....

State.....

Periodicals mean much in your life. If you will help by a few arguments with your acquaintances and an occasional letter in a spare moment, put a cross mark here.

Will you help in securing the repeal of this iniquitous law?

CUT OUT. MAIL TO CHARLES JOHNSON POST, Room 1417, 200 PIFTH AVENUE, NEW YORK CITY.



WITH the coming of the New Year the national automobile shows bring a new spirit into motordom. The first of the shows of 1918, the great New York exhibition, is notable as the first war time show. It proved the atability of the industry under war burdens and the certainty of the great part that motor cars will play in the coming season and future years. One of the chief reasons for the adoption of the automobile was the inadequacy of the horse. Now that there is insufficient rail transportation, an even wider field of operation is offered to the passenger motor car.

THOUGH the government has cut off drawing room cars from railroad trains and discontinued many passenger trains that are not considered strictly necessary, the modern motor car saves the man of affairs from great inconvenience. The man with a high powered, safe, swift passenger motor car, certainly need not be dismayed. Splendid roads connect New York with the large number of large cities nearby. Had it not been for railroad curtailments the individual transportation service to be had by means of the motor car for distances from 25 to 200 miles might never have become so thoroughly appreciated as an actual means of saving time. The same is true of Washington, Pittsburgh, Chicago, Philadelphia, Boston, Memphis, New Orleans, Kansas City, Denver, Los Angeles and many other cities. With the capable, thoroughly dependable motor car the business man may leave as early or as late as he pleases, need not be delayed by the various things that so often make railroad trains late, and, after he has reached his destination, he has the use of his own car while in town.

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-:::-
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Secretary D. O. BLACK, JR.
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25th of each month by the

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Times Building, Pawtucket, R. I.

ETAILED accounts of the services rendered to motorists who hold membership in the National Automobile Association are found on page 26 of this issue. The concrete good that comes with cooperation is found exemplified in the pages of the section devoted to the news, aims and accomplishments of this association. features of service are being prepared, in regard to which announcement will be made in later issues. Membership the coming season is a very desirable asset to motorists.

THE call for a continuance of car overhaul stories increases amongst our subscribers. Not all have been heard from as yet who probably wish to express themselves. Write to the Automobile Journal, tell just exactly what you think and what information may be added that will be of service to your motoring. Those who have made inquiries for their particular car will be accommodated as promptly as possible.

IVE topics to be taken up the next issue include how to prenare a car for resale, the motoring outlook, conservation of the car and the usual wide variety of practical hints, descriptions of new cars and the newest accessories. Building tendencies in the motor car industry will be treated soon in a special article by an expert. With all these features the new year is most promising in its outlook. They fulfill a popular need for motor car knowledge extraordinary in this most veer, when everything in this journal is prepared with the view to aid the general determination to win the war, inspire every motorist to maintain this patriotic rurnose and assist him in every way possible to do so. The motor car starts the new year with the fact of its indispensability fully proved.



PREMIER.

An extended victoria top, spot light, Motometer and windshield cleaner come as additional equipment on new Premier models.

VELIE.

There is an entirely new line of Velie bodies and the tops are fitted with curtains that open with the doors.

WESTCOTT.

A "self-acting" top is fitted on all new Westcott models and wick-fed oil cup lubrication throughout has replaced the grease cups.

CADILLAC.

The model 57 Cadillac eight-cylinder engine has detachable heads, which greatly facilitate overhauling and repairing. Tilting headlight reflectors and a radiator condenser are other improvements in the new models.

JACKSON.

On the new Jackson "Flyer" model the new equipment includes a motometer and tonneau light.

HOLLIER.

The model M 206 Hollier has a new Continental motor, 3 % x4 %, a special racing type of body, which has very attractive lines. The car has improved riding qualities, due to new cantilever spring construction.

YALE.

A number of very imporant improvements are noted in the new Yale Eight, including a Jacox steering gear, Colonial motor, long & Beck clutch, Detroit gear and transmission, Radometer, combination dash and trouble light and improved cusbions.

ALLEN.

The bodies of the Allen car for 1918 are of a more pronounced streamline type and have a slanting windshield. The rear seat is four inches wider and with double deck is upholstered cushion springs. Engine innovations on the Allen are as follows: Heavier crankshaft, lighter reciprocating parts, Heavier extra long connecting rods, starting and lighting, Auto-Lite two-unit system, Connecticut manual ignition, Perfex Perfex honeycomb radiator, Borg & Beck single dry disc clutch, increased gear ratio, Hotchkiss drive, hollow propeller shaft with two universal joints, full crowned tenders and mud splash guard below radiator, all electric control on steering column.

AUBURN.

Two chassis models are exhibited, with a complete line of body types. The 6-44 has a Continental engine and the 6-39 a Tector-Hartley engine.

BELL.

A Continental motor is being used in the Bell chassis this year instead of a Lycoming, as used last year, and the finish of the car has been greatly improved through the use of Spanish leather trimmings in the upholstery.

DISPATCH.

A motor driven tire pump is included in the regular equipment on the 1918 Dispatch cars.

GHENT.

All the new Ghent models this year are fitted with full equipment and have

also the most up-to-date convenience to increase the riding comfort of the passengers.

HARVARD.

The gas tank on the new Harvard has been shitted to the rear of the chassis and the Stewart vacuum system of fuel feed installed.

HATFIELD.

Hatfield equipment for 1918 includes a spare tire and a bumper. The war tax is included in the price.

LAUREL.

The Laurel engine for 1918 has 16 valves and an M. & S. differential is employed.

AUSTIN.

An Austin two-speed axle and Austin couble cantilever aprings are Austin features for 1918.

CASE

Case features for the new models are: Keliog tire pump, in unit with transmission and running in oil; bulis eye lamps in back of each front seat of touring and roadster; wheelbase 125 inches, an increase of five inches over previous models; Marshall cushion springs, for backs and cushions; folding, slanting, rain vision, ventilating windshield.

DORRIS.

Dorris equipment on the 1918 models will be most complete: One-man top and dust cover, rain vision windshield, ventilating top and bottom; 60-mile Warner speedometer, tire carrier, extra demountable rim, electric headlights with dimmer and small four-inch individual anchor lights, Boyce motometer, electric tail light with license carrier, electric tail light with license carrier, electric horn, electric inspection light, robe rail, toot rest, complete set of tools, jack and tire repair outfit.

KISSEL.

A new exclusive Kissel feature is the all-year top sedan and staggered door sedan which can be entirely removed or all windows lowered or raised full length.

KLINE.

The 1918 Kline Kar has a new straight front and radiator instead of the V type formerly used and a higher hood, which has less slope from cowl. The car is hung one inch lower, but has the same road clearance. There is also the new Kline sport model with low sides to body, long and rakish with longer rear springs. Additional equipment this year includes motometer and spot light.

LOCOMOBILE.

Outstanding new features of the new Locomobile are found in the tandem dual ignition system, Berling magneto and Lanchester damper.

NASH.

There are three new Nash models, all of which will have as additional equipment a Stewart Warner speedometer, clock, slanting windshield, one-man top and extra rim and tire carrier.

NATIONAL.

The 12-cylinder National models will have the airplane type of engine.

MAIBOHM.

Besides the Maibohm model B, which is an entirely new creation for 1918, a detachable winter top is fitted on the model A, making their roadster. The model A coupe is also new.

MAXWELL.

Maxwell sedans and coupes for 191' are equipped with wire wheels, which are also optional on the town cars.

MEIZ.

Westinghouse starting and lighting system and Atwater Kent ignition is standard equipment on the new Metz models. Improved body finish and slanting windshield are other new features.

PILGRIM.

Pilgrim model of its fully equipped, having a motometer, motor driven norn, gasoime gauge in tank at rear, one-man top, rain vision, ventilating windshield, extra tite carrier and rim.

REGAL.

The 1918 Regal is equipped with Auto-Lite starting and lighting system and Atwater Kent ignition.

SENECA.

A number of changes are found in the new Seneca models, including, heavier axle and bearing equipment, heavier front spring equipment and other small improvements in mechanical construction. The gear ratio on high is 4.500 to 1. A new style of upholstery has also been adopted.

STUTZ.

All 1918 Stutz cars are equipped with the 16-valve motor and a number of slight changes are noted in the body designs. New style of tire carrier has been adopted and instrument boardare installed on all models. Tire equipment is 32x4½ all around on all models.

WOLVERINE.

Wolverine cars are primarily custom made. The bodies are built of aluminum with individual fenders of either aluminum or patent leather.

HAL-TWELVE.

An entire new line of body styles is presented in the 1918 Hal-Twelve models, which have as features a new fiveplece ventilating hood, Lustig spring cover, new radiator, fenders and splash aprons.

DIXIE.

New body features on the Dixie lineare the most important changes in the 1918 models. A new sedan body is furnished with the left hand door forward for the convenience of the driver in entering or leaving the car without disturbing passengers in the rear compartment. The driver's seat is made wider and more commodious and the right hand forward seat is made to fold up against the side of the body.

COLE EIGHT.

Cole Eight, models 870, 871, 872, are equipped with the new Aerotype bodies

COLUMBIA SIX.

All models of the Columbia Six are being equipped with thermostat attach ment, which controls radiator shutter. This device maintains a proper temperature in the cooling system and greatly increases the efficiency of the motor. Plate glass lights with silver plated moulding are used on the sport model

Service List for Orphan Car Repair Parts

Numbers Appended to Names of Cars Listed Correspond With Those Against the Dealers and Makers Enumerated in the Subjoined Columns

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R. C. H.—8, 9, 10, 14, 32, 30, 101, 134, 143, 146, 150, 154. Randolph truck—11, 50, 156, 156, 156. Rainler—76, 143, 150, Rapid—14, 58, 150, Rapid—14, 58, 150, Rapid—14, 58, 150, Rediang—73, 150, Reliance—150, Reliance—150, Republic—10, 156, Ricketts—158, Rider-Lewis—3, 11, 111, 113, 114, 120, 150, Royal Tourist—143, 150, 160, Russel—8, 8, 16.

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Sampson—8, 9, 10, 58, 143, 150, 171, 172.

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Navoy—58,
Saybrook—58,
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Southern—150, 170.
Spaulding—9, 10, 13, 150.
Specdwell—8, 9, 10, 80, 83, 103, 124, 150.
Sphinx—8, 0, 10, 185.
Springfield—66,
Standard Six—9, 58, 124, 150, 161.
Starv—131, 150.
Staver—8, 9, 10, 12, 14, 124, 150, 164.
Sterling—12, 107, 166.
Stevens-Duryen—13, 124, 143, 150, 174, 175, 176, 177, 187.
Stoddard-Dayton—8, 9, 10, 13, 14, 18, 58, 90, 124, 143, 150, 171, 173.
Stratford—68.

Tineher—40.
Thomas—0, 10, 11, 14, 20, 80, 101, 124, 142, 150, 150, 150, 180, 180, Thomas—Detroit—8, 9, 10, 180.
Touraine—88.
Teurist—23.

Suburban-8, 9, 16, 156, Sultan-80, 148, 150, Traveller—183, Trumbull—26, 111, 113, 130, 150, 184, Twombley-63, 150, 181.

Van Dyke—150. Victor Thomas Detroit—5.

143, 156. Virginian—8, 9, 10. Wagenhal—150, 157. -0, 10, 21, 88, 150, Walters—8, 9, 10. Waltham Orient—128. Warren 8, 9, 10, 13, 14, 80,

124, 150, Washington -9. 10. 150. Waverly (electric)-114. Wnyne-124, 150. Welch Detroit-150. Welch-Marquette-141. Weich Pontine-150.

Whiting-8, 9, 10, 39, 150. Woodworth--150.

Yale-30.

Zimmerman-8, 9, 10, 191. Zip-23.

DIRECTIONS: To Find Where to Obtain the Part Desired, Look for the Name of the Car in the Car List and Refer to This List of Firms by Number.

- Alco Service lco Service Co., 161 St., Philadelphia, Pa, 168-162 N. 22nd
- American Locomotive Co., Provi-dence, R. I.
- American Motor Parts Co., 430 N. Capital Ave., Indianapolis, Ind. Anchor Buggy Co., Cincinnati, O. Anchor Motor Car Co., St. Louis, Mo.
- Arnold, Adam E., 212 S, 11th St.,
- Reading, Pa. Ardsley Motor Car Co., Yonkers, N. Y. Auto Gear and Parts Co., 291-93 Ma-
- rietta St., Atlanta, Ga.
 Auto Gear and Parts Co., 1461 S.
 Michigan Ave., Chicago, Ill.
 Auto Gear Co., 844 5th Ave., New
- 10 York City.
- Auto Parts Co., 737-739 W. Jackson Boulevard, Chicago, Ill. 11
- Auto Parts Co., Elkhart, Ind. 13
- Auto Parts Co., Omans, Neb. Auto Parts Co., St. Louis, Mo.
- Autocar Co., Ardmore, Pa.
- 16 Auto Parts and Repair Co., Spring-
- field, Mass. Automobile Mechanics Corp., 221 W. 17 53d St. New York,
- Auto Sulvage Co., 1701-05 Main St., 18
- Kansas City, Mo. Babel, L., 371 East 29th St., Chicago, 19 211
- Babcock Mfrs. Supply Co., Water-20
- town, N. Y. Barley Motor Car Co., Streator, Ill Bauer Machine Works, Kansas City,
- Berkshire Motor Co., Pittsfield, Mass.
- Bever Mfg. Co., First and Oklahoma Aves., Milwaukee, Wis.
- Belcher 25 Engineering Co., 43 Ames St., Cambridge, Mass.
- Bergdoll Co., Louis J., Philadelphia, 26 Pa.
- Bimel Automobile Co., Indianapolis, 27 Ind.
- Boulevard Motor Co., Waverly St. & Putnam Ave., Cambridge, Mass. Briggs-Detroiter Co., Hancock and
- 20 Berks Sts., Philadelphia, Pa.
- Brown-Lipe Gear Co., Syracuse, N. Y. 30
- Buda Co., Harvey, Ill. 31
- Burt Motor Car Co., W. J., 32 Hope Sts., Los Angeles, Cal.
- Cameron Mfg. Co., New Haven, Conn. 33
- Car-Nation Motor Car Co., Detroit, 34
- Mich. Case, T. M. Co., J. I., Racine, Wis. Central Auto Supply Co., Philadelphia Pa. Chadwick, De Lamater Corp., 159 W.
- 37 24th St., New York, N. Y
- Chadwick Engineering Works, Potts-22 town, Pa.
- 40
- Chevrolet Motor Co., Flint, Mich. Chicago Coach and Carriage Co., Chicago, Ill. 41
- Chief Motor Co., Detroit, Mich. Clark Auto Co., Atlanta, Ga. Clark Motor Car Co., Shelbyville, Ind.
- Clyde Cars Ce., Clyde, O. Costes-Goshen Auto Co., Goshen,
- N. T. Colburn Automobile Co., Denver, Col.
- Columbia Auto Repair Co., Hartford, Conn. 48
- Columbus Buggy Parts Co., 400 Dub-
- lin Ave., Columbus, O.
 Colter, A. W., Toledo, O.
 Connecticut Auto Parts Co., 1070
 Main St., Hartford, Conn.
 Corbin Motor Vehicle Corp., New 59
- Britain, Conn.
 52 Crescent-Ohio Service and Repair Co., St. Bernard, O.

- Crow Eikhart Motor Co., Eikhart, Ind.
- Cutting Co., Robert M., 2635-2645 S. Wabash Ave., Chicago, 111.
- 55 Cutting Motor Car Co., Waterloo, Ia. Croxton Motor Co., Washington, Pa.
- **57** Dauen Mig. Co., Sandusky, U. 58 Dayton Auto Parts Co., 351 W. 52nd
- St., New York, N. Y. DeKalb Wagon Co., DeKalb, Ill.
- e Tamble Motors Co., 430-432 N. Capitol Ave., Anderson, Ind. De
- 51 Detroit-Wyandotte Motor Truck Co., Wyandotte, Mich.
- Drenco Atachine and Garage Co., 527 FILLD Ave., New York, N. Y.
- Driggs-Seabury Ordnance Co., Shar-
- on, Pa. E. & D. Garage, 12 E. Eighth Ave.,
- Denver, Col. Elknart Carriage and Motor Car Co., 65 Elkhart, ind.
- Elyria Beiting and Machinery Co., Elyria, U.
- 67 Enger Motor Car Co., Indianapolis, lud
- Erbes, L. C., 2654 W. University Ave., St. Paul, Minn.
- Erickson & Stainaker, Denver, Col. Ewing, L. E., Cleveland, O.
- Filer & Stowell, Milwaukee, Wis.
- Florence Motor Rep. Co., 250 W. 54th St., New York, N. Y. Frank, Paul A., 2349 Michigan Ave.,
- Chicago, Ill.
 Gaeth Motor Car Co., 2103 Lorain
 Ave., Cleveland, O.
 Gale Auto Accessories Co., 423 Grand
- River Ave., Detroit, Mich.
- Gartord Motor Truck Co., Lima, O. General Auto Repair Co., 998 Race St., Cincinnati, U.
- Glilette Motors Co., Mishawaka, Ind. Goldberg, H., 1420 S. Eighth St., Philadelphia, Pa. Gorey & Co., J. C., 354 W. 50th St., New York, N. Y.
- 80
- Gramm Motor Truck Co., Lima, O. Great Western Automobile Co., Kal-
- amazoo, Mich. Green Engineering Co., Dayton, O. Gustin Auto Co., 18 E. Mitchell Ave.,
- Cincinnati, U. Haas Electric and Mfg. Co., R., 305
- 307 E. Monroe St. Springfield, Ill. Haberer & Co., Cincinnati, O. Harper, E. V., Mason City, Ia. Harris Bros. Co., Chicago, Ill. SA
- 22
- Hartford Motor Car Co., Hartford, Conn.
- 90 Hassier Motor Car Co., Indianapolis, Henderson Motor Car Co., Detroit,
- Mich. 92
- Herreshoff Motor Co., Indianapolis, Ind.
- Hinsdale Electrical Supply Co., Hins-93
- dale, Ill.
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- Holmes Garage, Danville, III. Huebotter, H. A., Davenport, Ia. Huron Motor Car Co., Dearborn,
- Mich. 98 Imperial Automobile Co., Detroit,
- Ave. and 64th St., New York.

 Jackson Automobile Co., Jackson, 99
- 100
- Mich.

 Jahns, W. H., \$08-13 W. Pico St.,

 Los Angeles, Cal.

 Johnson Service Co., Milwaukee, Wis. 101
- 102 103
- Kany, A. S., 251 Boyer St., Dayton, O. K. C. Auto Parts Co., 1827 McGee St., Kansas City, Mo. 104

- 105 Keeton Motor Car Co., Detroit, Mich. Kelsey Motor Co., Hartford, Conn.
- 106 107
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- Levengood, A. J., 153 N. Fourth St., Reading, Pa. 112
- 113 Lion Motor Parts Co., Philadelphia-Pa
- Longaker Co., V. A., 448-450 N. Capi-
- tol Ave., Indianapolis, Ind. Loper, G. E., Port Jefferson, N. T.
- Lozier Motor Co., Detroit, Mich. 116
- L. P. C. Motor Co., Indianapolis, Ind.
- Marathon Service Co., Nashville, Tenn.
- Marion Motor Service Co., Indianapolis, Ind.
- Mason Motor Car Co., Detroit, Mich.
- Mathewson Co., Frank E., Wilkes-
- barre, Pa. Maxwell Motor Sales Corp., 675 Golden Gate Ave., San Francisco,
- Maxwell Bros., 3921 Olive St., St. 124
- Louis, Mo. Mercury Mfg. Co., Chicago, Ill. 125
- Meteor Motor Car Co., Piqua, O. Meteor Motor Car Co., Shelbyville, Ind.
- 128
 - Metz Co., Waltham, Mass. Michigan Motor Car Paris Co., De-
- troit, Mich.

 Midland Motor Co., 2200-2218

 Diamond St., Philadelphia, Pa.,

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- 181 onier, Ind.
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- Moore & Co., John, \$204 Broadway, New York, N. Y. 134
- Motor Corp., rear 1309 Race St., Phil-adelphia, Pa. 135
- Muskegon Automobile Co., Muskegon, Mich. ew Columbus Buggy Co., Colum-
- bus, O.

 New Departure Mfg., Bristol, Conn.

 New Jersey Machinery Co., Newark.

 N. J.

 Northway Auto Parts & Sales Co.,
- 228 Kearney St., Cincinnati, O. Oldsmobile Co., Chicago, Ill. 141
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- Pacific Motor Car Exchange Co., 321 W. 53d St., New York City. Pathänder Co., Indianapolis, Ind. Petrie & Morganthall, Greencastle, 145
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- Philadelphia Machine Works, 61-71
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- Mich.
- R-C-H Corp., Detroit, Mich. Red Arrow Auto Co., Orange, Republic Motor Car Co., Yo town, O. Mass. 155 Youngs-
- Riverside Machinery Depot, Detroit. Mich
- Ricketts Auto Works, Detroit, Mich.



Against A Tax On Intelligence

FEW readers of the periodical press of America realize with sufficient clearness the fact that the hasty postal law passed by the last Congress on a zone rate basis places an enormous burden on the reading public. An advertisement on another page of this issue calls attention to how this postal legislation, included in the Revenue Bill, progressively increases the average carrying charge upon newspapers and periodicals from 50 to 900 per cent. It also calls attention to the restrictive and blasting effect that may be expected upon the publishing business in its function as a popular educator.

Never before in the history of this country has it ever crossed the mind of any citizen that it would be necessary to form organizations of readers in order to preserve their right to acquire information regarding their business and greatest interests in the columns of technical and trade papers. Yet this is a burden that falls upon readers now. The heavy increment of postage which the law imposes on the publisher rests there only temporarily. The operation of common sense soon develops that the money increase passes at once to the reader. If zone rates for subscriptions be not imposed, the periodical would be so handicapped that it would be compelled to go out of business or lower the value and volume of its contents. Take either horn of the dilemma and it is the reader who suffers.

Postal rates are transportation rates It is true that the publisher prepays postage. Yet it requires only moderate business acumen to realize that rostage is entered on the books as cost of distribution and enters into the price at which the newspaper or periodical is sold.

An increase by a flat rate could be handled more readily than the far reaching, high jumping costs under the zone rate plan. Every fair investigation of the zone rate has shown that it is too full of inequalities for application to the circulation of educational trade periodicals. But it is beside the mark, here, to examine at great length the most efficacious method that the government may find to levy a war tax on the readers or publishers of technical magazines. It is clearly evident now that the repeal of this law is imperative for the good of all.

Technical or business information such as the upstanding men of America need today is not found in every local print. The great value of the technical prints to merchants, doctors, lawyers, engineers, architects, machinists and other skilled persons is threatened with restriction, if not absolute deprivation, the minute they are made more costly or harder to get by mail.

The government would not have the voung engineer, just out of college and on his first job on some big construction work in a remote corner of the West

iorced to pay a heavy tax if he is to receive regularly the great engineering magazines which keep him a student, interested and ambitious to know the best ways of overcoming the thousands of obstacles with which nature continually confronts the engineer. The government would not deny to the old engineer this record of the modern things which are gathered through national facilities and accurately published to help make big men and keep them big.

The government would not deny the machinist, crowded with his day's work in the great factory, the right and privilege in his home at night of learning through the magazines devoted to his field better, more efficient, more economical and less dangerous ways of doing his important day's work. The government would not have the motor mechanic depend on the brains of the single shop in which he works for new

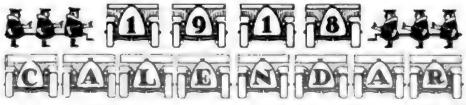
ideas. It would not want him in time to become a single-cylinder man in a race with 12-cylinder competition. Yet he must risk this fate or pay this postage tax on intelligence in case he lives in a far-away zone from the one in which his favorite journal—the one he understands, the one that gives him the most of what he needs and does it in the clearest way-is published. The government would not deprive a man of his necessary information about his motor car, but such a terrific tax will mean there will be hundreds of thousands less readers of motor publications throughout the country.

The reader's tax would be regulated wholly by the distance his store or home happens to be from the publication office. Inequality of opportunity appears in the zone postage plan, which is too palpably a perversion of democratic institutions to last. Help repeal it.

There is opportunity to do something to correct this matter at once. Fill out and send the blank printed in this issue in the advertising section.

show, Armory, 166th St.....Feb. 9-16

St. Louis, Mo., automobile show Feb. 11-16



SHOWS.

Washington, D. C., carnival and open house week......Jan. 11-18 Providence, R. I., automobile showJan. 11-19 Philadelphia, 17th annual automobile show.....Jan. 11-19 Rochester, N. Y., 10th annual automobile show, Exposition Park. Jan. 14-19 Milwaukee, Wis., automobile show...Jan. 18-24 Detroit, Mich., annual show...Jan. 19-26 Montreal, Can., automobile showJan. 19-26 Cleveland, O., 17th annual automobile show......Jan. 19-27 Scranton, Pa., automobile show Jan. 21-26 York, Pa., automobile show...Jan. 21-26 Portland, Ore., automobile show Mifflintown, Pa., automobile showJan. 22-26 Allentown, Pa., automobile show....Jan. 23-28 Bridgeton, N. J., automobile showJan. 26-Feb. 2 Chicago, III., national automobile showJan. 26-Feb. 2 Chicago, III., salon, Congress hotelJan. 26-Feb. 2 Columbus, O., automobile show.....Jan. 26-Feb. 2 Harrisburg, Pa., automobile show.... Manchester, N. H., academy Jan. 28-Feb. 2 Minneapolis, Minn., automobile showFeb. 2-9 Binghamton, N. Y., show......Feb. 5-9 Kansas City, Mo., automobile show New York, Bronx dealers' automobile

Toledo, O., automobile show. . Feb. 11-17 Newark, N. J., automobile show...Feb. 16-23 San Francisco, second annual automobile show......Feb. 16-24 Waterbury, Conn., automobile show.Feb. 18-23 Des Moines, la., automobile show...Feb. 18-23 Syracuse, N. Y., automobile show...Feb. 18-23 Grand Rapids, Mich., automobile showFeb. 18-23 Springfield, O., automobile show...Feb. 18-23 Pittsfield, Mass., automobile show...Feb. 18-23 South Bethlehem, Pa., car and truck show......Feb. 18-27 Brooklyn, N. Y., motor vehicle show...

Muskegon, Mich., automobile show...

Feb. 25-March 2

Boston, Mass., Boston Automobile Dealers' Association show......March 2-9

St. Joseph, Mo., automobile show....

March 6-9

Trenton, N. J., automobile show....

Omaha, Neb., automobile show......

Bridgeport, Conn., automobile show

Great Falls, Mont., automobile show

March 16-20
Stockton, Cal., automobile show

April 9-13

Extensive Scope of the Automobile Industry

Friends of motor cars in this country know that motor manufacture and the motor truck makes an overwhelmingly big industry. The accompanying chart attempts to show graphically the enormous extent of the industry and what an interdependent business it is, how it helps to support dozens of other indusannually. The 1080 parts and accessory makers, indicated, have an invested capital of \$336,000,000, and employ 320,000 workers, with an annual pay roll of \$288,000,000, and during the year ending June 30, 1917, tire makers produced 18,000,000 tires, valued at \$450,000,000, nearly half of which amount were taken

tries and provides a livelihood for nearly 1,000,000 employees and their families and is the sole dependence of 27,800 distributors and dealers. MAYERS TRUCK In the top row of cirby car makers to cles in the chart, which equip new cars durwas prepared by the ing the year. National Automobile In the central Chamber of Commerce, square of the chart are composed of manufacautomobile PALEST PA OBO MOTOR CAL turers, are the raw matruck manufacturers terials, produced by who draw these parts the industries shown, and materials that enwhich are drawn upon ter into the construcin the second row for tion of complete motor the production of fabvehicles from the parts

tomobiles, automobile Chart Showing the Scope and Mag- raw and partly fabriparts and accessories, nitude of the Motor Vehicle Indus- cated materials. A totry and its Relations with Other Dependent Industries.

for the year ending June last.

Contrary to the general supposition the motor industry is not located in one small territory, around Detroit, Chicago, Cleveland and Indianapolis. There are 550 makers of passenger cars and trucks with factories located in 32 different states of the Union. These plants represent an investment of \$736,000,000 and give employment to 280,000 workers.

Merchandising motor cars is an enormous business within itself, some 2800 distributors being engaged in it, with \$41,000,000 invested and an annual pay roll of \$25,200,000, which is paid to upwards of 28,000 employees. There are also about 25,000 retail dealers throughout the country, with an invested capital of \$184,000,000, who employ 202,000 salesmen and workers, with an annual pay roll of \$158,000,000. The garage and repair shops for the most part being conducted by either distributors or dealers, are included in the figures for those branches, but there are thousands of independent garages and repair shops not connected with car agencies of which no account has been made.

There were a total of 2,242,800 registered automobile owners in this country on July 1, 1917, of which number 400,000 were commercial car users. The business created by this vast army of owners does not cease with the purchase of a car, but they have to provide garage accommodations, have repairs made, buy tires, supplemental equipment, automobile clothing and other things from the 2550 supply houses, who in turn draw their stocks from the accessory makers, and also purchase large quantities of gasoline from the gasoline stations who get their supplies from the oil companies.

LONDON DEPARTMENT STORE SELLS GAS FOR MOTOR CARS.

partly

ricated

and

manufactured materials

used by makers of au-

amounting in all to a

value of \$300,000,000

Selfridge & Co., Ltd., the largest department store in London, in advertising its gas bags for coal-gas operated motor cars, offers to fill them free if they are purchased of the company. Since the use of gasoline is practically prohibited in England thousands of motorists and truck owners have equipped their cars with these large bags, which hold about 300 feet of illuminating gas.

MONTANA SHOW IN MARCH.

The Montana Automobile Distributors' Association, Great Falls, Mont., will hold its second annual automobile show in that city March 16-20. A. J. Breitenstein will again manage the show this year.

GOODYEAR BRANCH BURNS.

The Hartford, Conn., plant of the Goodyear Tire and Rubber Co. was destroyed by fire on Dec. 11 and automobile tires valued at \$300,000 were lost.

ALCOHOL AS FUEL IN AUSTRALIA

and

and accessory makers,

and also directly from

the manufacturers of

tal of \$480,000,000 was

paid for these supplies

Scientific Council Reports Adversely to Motor Car Use Owing to Starting Difficulty

The Commonwealth Advisory Council of Science and Industry of Australia has published the report of its special committee on the question of alcohol fuel for engines. The committee reported that any ordinary gasoline engine may be run on alcohol except at the start and that the consumption of alcohol in such engines is about 50 per cent. greater than that of gasoline per horsepower de-In specially designed alcohol veloped. engines the consumption of alcohol per horsepower is no greater than that of gasoline. The changes needed in the design of an engine to use alcohol are:

Increased compression from about 75 pounds to 180 pounds per square inch, preheating of fuel, air of mixture and increase in area of fuel supply pipes.

The carburetor must be preheated in

starting or an arrangement made for the use of a little gasoline. Exhaust gases preheat after the start. The committee decided to turn its attention to stationary engines rather than to motors for automobiles because of starting difficulties and the advantage as demonstrated that is found in slow speed engines with a long piston stroke. The successful alcohol in Germany was almost wholly of this type.

The following yields are reported in gallons of alcohol per ton of raw material used: Corn, 80-83; barley, 65-70; wheat, 80-85; potatoes, 15-24; beet, 12-16; apples, pears, apricots and peaches, 9-14; gum tree, 12; soft wood saw dust, 20; grapes, 18; molasses, 65-70.

A benzol-alcohol mixture was considered without recommendation.

Thermostatic Control a Feature of 1918 Cars

Thermostatic control characterizes a mechanical advance of 1918 machines over those of former years. The question of efficiency today is entirely dependent upon heat, and conservation of heat calls for accurate mechanical control in both the carbureting and radiating systems. Devices called thermostats are built in many of the present day radiating systems, which govern the water passing into the radiator or bypass it back to the cylinders. A recent innovation in design permits the cutting off of the radiator surface by means of a shutter like arrangement which is thermostatically operated.

Another device which makes for efficiency automatically opens and closes the carburetor needle valve as the heat decreases and increases.

Thermostatic metal, made by the General Electric Co. of Schenectady, is designed for operating all sorts of devices which depend upon change of temperatures. This new material consists of two sheets of metal having widely different coefficients of expansion, solidly welded together until they resemble one solid piece. As heat is applied one of the metal strips begins to expand, while the other having a low coefficient of expansion does not expand to such a degree. The result is a bending or warping of the strip, which continues in proportion to the amount of heat applied until the limit of expansion is reached or fusion commences. The G-E product may be used for temperatures as high as 590 degrees, and the distortion or bending effect is always the same whether the change is between zero and one degree or between 499 and 500 degrees.

Analysis of the accompanying chart (Fig. 1) shows the results of heat application from zero to 260 degrees Fahrenheit. The metal strip used in this experiment was practically straight at the normal temperature of 74 degrees, but at 260 degrees it bent to practically one inch out of line, and at zero, .4 out of line in the opposite direction. The piece used was four inches long and .03 of an inch thick. For radiator control work the temperature changes vary between normal

and 212 degrees and reference to the chart will show a distortion or bend of approximately three-quarters of an inchin the transition from average temperatures to that of boiling water.

Actual distortion, however, is not the only item to be taken into account. The strip must exert a certain force where it is used for opening and closing valves such as are found in the circulating system. That the G-E thermostatic metal has this property is shown by the second chart (Fig. 2). This chart was made upon a basis of experiments performed with various thicknesses of strips, four inches long by 5/16 wide and covering a temperature change of 100 degrees Fahrenheit. The force exerted by a metal strip, same as used in making chart Fig. 1, shows slightly over two ounces in the 100 degrees change.

The value of a metal that has a definite curve with varying temperatures should be great to the manufacturers of all kinds of electrical carburetor or radiating systems that are designed to function differently with temperature changes. The wide range of deflection, together with the proportionately great force exerted with changes of temperatures makes possible the operation of large sized valves and finer adjust ments for small changes.

Another property which makes the metal of interest is found in its resistance to taking a permanent set under the application of heat and outside force. The metal strip used in making the first chart requires 6.5 ounces to obtain a permanent set in a temperature change of 100 degrees.

This valuable metal is manufactured in various standard thicknesses, ranging from .25 to .015 of an inch in thickness and may be obtained up to six inches in width by 36 inches in length. It may be stamped or pressed into practically any desired shape, and when annealed will have all its original inherent qualities. It is non-corrosive and the manufacturers claim that there is absolutely no slip of one metal on the other in the strip.

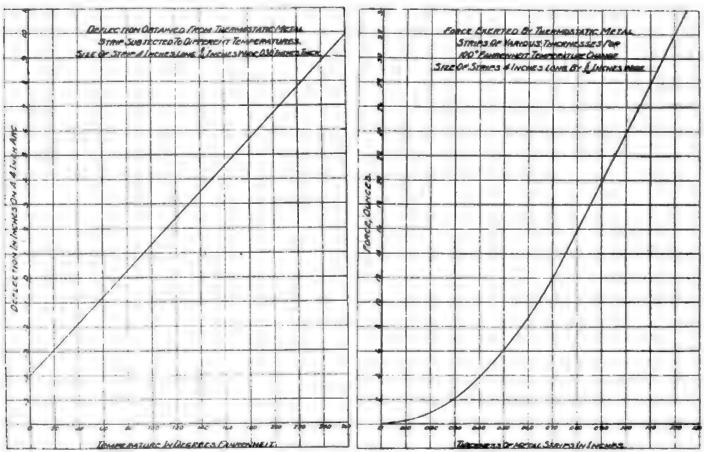


Fig. 1-Deflection Chart.

Fig. 2-Exertion Chart.







half way to the hem on one side and twothirds to the hem on the other. The new skirts have a pocket on one side only and it is usually given a decorative outline of embroidery or tiny buttons.

AMERICAN BUREAU OF ENGINEERING INJUNCTION.

The American Bureau of Engineering, makers of AMBU, the Electric Trouble Shooter—through their attorneys appeared before Judge Carpenter in the United States Circuit Court and secured a restraining order prohibiting the sale of the so-called Official Wiring Guide as published by the International Motor Institute.

The contention of the American Bureau of Engineering was that the wiring diagrams published and offered for sale by the defendants are deliberate copies of the 400 copyrighted, authentic wiring diagrams of the American Bureau of Engineering. As part of the comprehensive information comprising AMBU service, the AMBU wiring diagrams, distinguished by the circular copyright imprint of AMBU, are looked upon as standard and authoritative and the garage men should therefore be apprised of this action. The injunction was sustained when the case was heard in court

FORD FIXES MAXIMUM PRICE LIST FOR USED FORDS.

The Ford Motor Co. has sent to Ford dealers throughout the country a list of maximum prices at which Ford cars are to be taken in trade. The list is based on cars in the best of condition and the allowance price is to be in no way affected by the number of cars sold in any one instance. In Detroit the dealers received the following list:

Model	1912	1913	1914	1915	1916	1917
Touring	\$85	\$90	\$100	\$135	\$150	\$225
Roadster	75	80	90	125	140	215
Coupelet	1.6		- 4	240	285	300
*Coupelet						400
Sedan				325	375	525

New style

Ford dealers at Baltimore have published a similar list in which the allowances are higher. The list is as follows:

Model	1914	1916	1916	1917
Touring	\$150	\$175	\$190	\$285
Roadster	125	150	160	200
Chassis	100	125	135	163

Additional equipment on a used car is allowed for at the rate of about 25 per cent, of its original cost, except in the case of self starters, which are allowed for on the basis of about 50 per cent, of their original cost.

PROF. FILES HEADS MAINE A. A.

Association Cooperating in State's Road Building Programme Assured in 1918

T THE meeting of directors of the Maine Automobile Association, held in Portland, Prof. G. T. Files of Brunswick was re-elected president of the organization. Hon. John Clark Scates was re-elected secretary and treasurer and the following vice presidents were elected: First vice president, Hiram W. Ricker, Sr., Poland; second vice president, Charles H. Fogg, Houlton; third vice president, Forrest H. Colby, Bingham; fourth vice president, R. J. Peacock, Lubec; fifth vice president, Wilfred A. Hennessy, Bangor; sixth vice president, E. B. Sanger, Bangor; seventh vice president, Walter B. Parker, Cape Elizabeth; eighth vice president, Oakley C. Curtis, Portland.

The following chairmen of committees for the ensuing year were appointed:

Legislative committee, Chas S. Hichborn, Augusta; road book committee, D. W. Hoegg, Jr., Portland; road signs and prison labor committee, A. Q. Miller, Auburn. These chairmen will name the remainder members of their committees, Mr. Hoegg already naming his road book committee as follows: George T. Files, Brunswick; Walter B. Parker, Cape Elizabeth, and William D. Pennell of Lewiston.

D. W. Hoegg, Jr., was re-elected chair man of the information and publicity bureau, which has headquarters at 12 Monument square, Portland. It was decided to publish the annual edition of the association's road book and announcement was also made that Maine's road building programme would be carried out and while the highway department would devote its energies mainly to constructing such arteries of travel that would prove valuable in war time, all of the secondary highways would be maintained during the coming year

NEW SCRIPPS-BOOTH ORGANIZATION PERFECTED.

The new organization which will conduct the affairs of the Scrinns-Booth Co., now controlled by General Motors, has been perfected with the election of W. C. Sills as director.

The officers are: President, A. H. Sarver, formerly manager of the Buick Motor Co.; directors, Fred W. Warner, president and general manager of the Oakland Motor Car Co.; Edward Verlinden, president and general manager of the Olds Motor Works; W. C. Sills, general sales manager of the Chevrolet Motor Co.; W. H. Little, formerly president of the Sterling Motor Co.; F. J. Sensenbrenner, vice president and treasurer of the Kimberly-Clark Co. Neenah. Wis., and N. J. Miller, a hanker of New York.

SUPPLYING IGNITION PARTS.

The parts used in the electrical equip ment, the very heart of the automobile. engage the attention of every automobile dealer and repair man in the particulars of their quality and the maintenance of an adequate supply. The necessities of service are prone to require the maintenance of a department and an extensive stock which runs up into a large sum of money. To obviate such difficulty and fill the dealer's need the Specialty Man ufacturing Co. of Arlington, Mass., makes a general supply line known as the "Superior" parts. In marketing them the company emphasizes these points: Prompt attention to every order; the making of parts from the finest grades of materials; the most attractive prices to be found in this market and the mak ing of deliveries when promised. These elements of their goods and service have played an important part in the huge success of "Superior" parts.

GOODRICH MEN STRETCH HANDS ACROSS THE SEA

This cablegram has been sent by the 22,000 employees of the B. F. Goodrich company to their comrades employed in the Goodrich factory at Columbes, France:

"The officers and employees of the B F. Goodrich company send their best compliments and wishes to the French Goodrich company for the coming year, for the success of the allied armies in the ranks of which are 1600 American Goodrich employees, who are striving to bring nearer the permanent disablement of the 'boches' at the same time their 22 000 compades support the war."

Most of the rubber workers abroad are Legion of Honor men who have been invalided out of active service by wounds.

MOTOR MECHANICS WILL RECEIVE ARMY COMMISSIONS.

Men who have had experience as motor repair foremen, between the ages of 28 and 45, are eligible to apply for commissions in the motor mechanics regiments that are now being formed under the Signal Corps. These men will officer the repair corps, which will have charge of the maintenance and unkeep of all motor equipment in the United States service, including aeroplanes, motor trucks, cars and tanks.

The examining board which passes upon the applications is holding three sessions weekly at present at the plant of the Packard Motor Car Co. in Boston

ENSIGN P. W. PAGE LOST AT SEA.

Ensign P. W. Page, formerly connected with the Boston branch of the B. F. Goodrich Rubber Co., was drowned off the coast of England while on duty in a scapiane. He enlisted in the service last May and is the first of 1624 Goodrich employees who enlisted to meet death on duty



Motorists Should Unite Against Class Taxation

Burdensome Laws, Unfair Exactions and Unjust Restrictive Legislation to Be Avoided Only by Prompt Cooperation

O MEET the exigencies of war time conditions considerable legislation will be enacted this year in the various states and many of these statues will effect the motorist, either as a direct or indirect tax. Many of these laws will be judicious, while many will not and would never pass if they met with opposition from motorists in organized form. The tendency to single out the motorist above everyone else to levy upon and legislate against is too pronounced throughout the country to be overlooked and the situation emphasizes the need of cooperation among motorists so that they can unify and strengthen their opposition to a point where it will be effective in checking the discriminatory practises.

Evidence in proof that many of these laws are hastily and unwisely drawn is on hand in many instances, and is overwhelming in the case recently cited in New Jersey. Provisions in the laws of 1917 session of the New Jersey Legislature, which is one of the foremost industrial and educational states in the Union, proved so impracticable and unreasonable that the chapters of the laws in which the objectionable provisions were incorporated have been suspended by William L. Dill, Commissioner of Motor Vehicles of the state. Truck operators, who were mainly affected by these provisions, know these provisions were being incorporated in the law last year when it was being drawn and had there been some authority or association in which they could have centralised their

opposition, such an absurd statute would never have been enacted for such a short life, even to cause so much trouble and unnecessary expense.

The individual motorist, even in the face of the numerous flagrant injustices that are heaped upon him year after year, does not recognize that the one avenue of hope to escape burdensome taxation and restrictive legislation is through cooperative opposition by allying his own influence with that of other motorists through an association which carries the weight of all its members in hearings before legislative bodies and officials. There is no better exemplification of the power of cooperation than that shown in the present campaign of the automobile manufacturers and conducted through its organization to have the three per cent, tax on car sales repealed. The Ways and Means Committee of Congress and the Senate Finance Committee have been appealed to on the grounds that the tax is unscientific and it is proposed that the tax be placed directly upon the user. It is a common belief in the industry that if it had been represented at the hearings before the law was passed, with the same unified strength and influence with which it is now appearing for the appeal, the tax would never have been levied in its present form.

A more fiagrant case of class taxation could hardly be imagined than that which it is understood will be proposed by Governor McCall of Massachusetts in his inaugural address. It is reported

that a special tax of \$5 on each automobile will be recommended and also that the drivers \$2 fee be increased \$3 to \$5. No good reason is offered why the automobilists should bear this extra tax to augment the state's treasury unless it is that the motor car is the handlest object to reach and the owners submit without the strenuous objections they should raise. Should such a tax be imposed it would mean that the automobile is subject to four direct taxes if an old one and five if a new one. The government is now collecting a tax of three per cent. of the selling price of a new car and while this is paid by the manufacturer, it is, of course, being paid by the user; the purchaser is taxed on the car for its personal property valuation in the city where he lives; the state collects a license tax which is far out of proportion to any other tax that is levied against property; the owner is also taxed for the privilege of operating the car. Motorists constitute as substantial an element in a community as any other class and realize that taxes are necessary, but this attitude should not be taken advantage of by tax commissioners and legislators to single them out to bear the burden whenever additional funds are necessary.

There seems to be little attempt to levy taxes equitably by placing them on all forms of personal property that would come in the same class as automobiles. There is no good reason why private horse drawn equippages, planos, musical instruments, costly house far-

nishings or other personal property of this character should not bear its proportionate share of taxation. In view of these facts the motoring public of Massachusetts will be strongly opposed to the proposed additional taxation and organized opposition has already been instigated. The automobile interests sent a letter to Governor McCall recording the opposition of the organization and will continue active in the fight against its adoption.

The letter, which was signed by officials of this association and all the leading automobile organizations in the state, was as follows:

> Boston, Mass Dec. 28, 1917.

His Excellency, Samuel W. McCall,

State House, Boston, Mass.

Your Excellency-We have been informed that you have been requested to urge in your forthcoming message to the urge in your forthcoming message to the Legislature the necessity of raising additional funds during the present war, and that it has been suggested to you that you urge upon the Legislature the passing of a law taxing automobilists of Massachusetts \$5 each and of raising the fee paid by operators to \$5.

If we have hear correctly informed we

If we have been correctly informed we respectfully wish to protest against the passing of any such law, and respectfully urge you not to make such a recommen-

dation in your forthcoming message.
We believe that as a body the owners of motor vehicles are patriotic; that they are lending their aid to the government are lending their sid to the government in various ways to help along in the war work, and that they will be willing to do so in the future. We do helieve, however, to have the motor industry solely singled out as a means of revenue at this time is unfair. If it should be decided that all vehicles such as horse drawn ve-hicles, street cars, as well as the motor vehicles, should be charged a war fee, we shall be glad to assume this added fourth burden.

The motor vehicle is not a luxury. The registramotor owners contribute now in while in personal property taxes they contribute many more millions, and the industry as a whole has added millions to the taxable values of the State of Massachusetts, while giving employment to thousands of men and women who receive good wages.

In addition to the above the government has placed a war tax on motor vehi-

If agreeable to you a committee representing the automobile interests in our commonwealth will be glad to wait upon

One strong point of opposition that will be brought up is the practical exemption of horse drawn vehicles from taxation that is supposed to be for the purpose of constructing and maintaining highways. Horse drawn vehicles use the highways and in service damage them as much, if not more, than motor cars, yet contribute practically nothing toward constructing them or their upkeep. If more money is required of an automobile operator for the privilege of operating it, why should not the driver of a horse vehicle also pay a tax?

William J. Tyler has been appointed as a member of the board of trustees of the National Automobile Association to fill the vacancy created by the death of William B. Plunkett.

Our Letter Box

Members Commend Service of Legal Department of N. A. A.

Many testimonials in the form of letters are on file at N. A. A. headquarters commending the service that has been rendered to members by the legal department through handling their cases in the courts. This department, which gives expert legal advice and assistance, defends members and their operators for violations of automobile laws anywhere in New England, and also in suits brought against members for damage to property, injuring or killing animals or damaging vehicles and in the adjustment of repair bills.

Through experience gained in specializing in these kinds of cases the department is especially efficient in handling such matters and its members, while receiving the service free as part of their membership, can feel assured that their cases are handled with dispatch and with the same consideration for results as if taken care of by their own attorneys.

A member who recently called upon the association's legal department to handle a case in wheih he became involved, wrote the following letter regarding its disposition:

National Automobile Association, 9 Park St., Boston, Mass. Dear Mr. Power:

I thank you very much for looking the automobile case against my feur. I am very much after chauffeur, pleased with the disposition you have been able to make of the case and if there is any charge that you have against me for any of the service you have ren-dered I shall be pleased to make remit-

There was, of course, no charge for this service and the member was so informed.

Another less recent case in which a member warmly commended the association for its work is shown by the following letter:

George H. Power,

National Automobile Association, Boston, Mass.

Replying to your letter of the 22nd, I am enclosing herewith a check for \$50. pavable to

I certainly appreciate your attention in this matter and am perfectly frank in saving that it is better than I expected. I told a friend about it and as a result he wants to join the N. A. A. Will you be good enough to send an application blank to him.

CAR LEFT IN THE HIGHWAY AFTER DARK.

Judge Crosby of the Supreme Judicial Court of Massachusetts in an opinion handed down in the case of the commonwealth against a defendant charged with operating an automobile after dark without displaying lights as required by the statute, rules that an automobile which is standing upon a highway after dark without lights and with the engine

at rest is an automobile "operated" within the meaning of the law.

The case has been in the courts for several years and has attracted widespread attention owing to the point of contention. The defendant was found guilty by the First District Court of Eastern Middlesex of violating the provisions of section 7 of chapter 534 of St. 1909 as amended by section 3 of chapter 16 of St. 1915. He appealed from the verdict and at the trial in the Superior Court he excepted to the refusal of the presiding judge to give to the jury four instructions, each of which in effect amounted to a ruling that he was entitled to an acquittal upon the The facts agreed upon agreed facts. and part of the decision of Judge Crosby follows:

"It is hereby agreed between the government and the defendant that on May 3, 1915, at about 8:30 in the evening, more than half an hour after sunset on said date, the defendant drove his automobile on Pleasant street, a public way in the City of Malden, in said County, and left it standing thereon; that when and as he it on said street it was properly lighted, but that when he left it standing as aforesaid he turned out both his front lights and rear light: that when he left the automobile standing, no part thereof was moving and that the engine was stopped; that defendant thereafter went into a building nearby, leaving said auto-mobile on said street until notified."

The statute under which the complaint is drawn was enacted largely for the pretection of travelers upon highways, by guarding against collisions with automo-biles after dark when it would be diffi-cult or impossible to know of their presence. The question is, whether an auto-mobile which is left standing upon a highway after dark without lights and with the engine at rest can be found to be "operated" within the meaning and intent of the statute.

It is obvious that an automobile standing upon a highway under such condi-tions may be fully as great a menace to the safety of travelers as if running upon the way without lights, and that the danger of serious injury to travelers by coming in contact with such an automo-bile would be very great.

The word "operated" is not, as the de-fendant contends, limited to a state of motion produced by the mechanism of the car, but includes at least ordinary stops upon the highway, and such stops are to be regarded as fairly incidental to its operation. It does not appear from the agreed facts how long the automobile had been left upon the street or for what purpose the defendant went into the building. Certainly there is nothing to show that he had left it for an unreason-able time, or that the stop was not for a proper purpose; nor is there any evidence that the car had been abandoned.

The statute must be read with reference to its manifest intent and spirit and cannot be limited to the literal meaning of a single word. It must be construed as a whole and interpreted according to the sense in which the words are employed, regard being had to the plain intention of the Legislature. So considered, we can-not doubt that the statute is broad not doubt that the statute is broad enough to include automobiles at rest, as well as in motion, upon the highways. Jaquith vs. Worden, 73 Wash, 349. Stroud vs. Hartford, supra. So far as the case of Harlan vs. Kraschel 164 Ja. 667, is in conflict with the views herein expressed, we are not disposed to follow it.

The defendant's requests for instructions were rightly refused.

Judgment affirmed



PLATE 14 B.

STUCCO GARAGE OF SPANISH EXTERIOR DESIGN

Special Drawings of an Attractive Building That Will House Two Motor Cars and Be an Ornament to an Estate

NUMBER of the less expensive types of private garages have been dealt with in the Architectural Department to meet the demand for structures of that type. are, however, many persons with means who desire the best housing for their car that they can procure and one that shapes up with the style of their home. Such an investment is not an extravagance, as it greatly enhances the value of the property upon which it is placed, besides affording the owner far more pleasure and service than he could obtain from his cars with a cheaper structure, or by keeping them in a public garage.

In the accompanying plan detail is shown of a garage that should cost about \$6000 under average conditions, and one that provides complete equipment and appointments for housing two cars and chauffeur's quarters. The exterior is fashioned after the Spanish type of architecture and presents a very attractive appearance with the two large front doors and pergola, surmounting the pediment. As indicated in the elevation plan the roof slopes gently from the peak and is carried out beyond the sides, modifying the otherwise rugged effect of the square structure.

With a length of 29½ feet and a width of 28 feet, the building provides ample room for two cars and the chauffeur's quarters. The latter are located in the rear of the building and include a living room 16x91/2 feet, a lavatory and a closet. The living room is ventilated and lighted with two windows, and has a door opening into the garage proper.

Besides the two main swinging doors which have glass panels in the upper halves, there is also an entrance on the side. The doorways are eight feet in width, with two four-foot swinging

doors in each.

The building is of semi-fireproof construction, having terra cotta walls with stucco facing on the exterior and plaster on the interior. The wall is 10 inches thick, eight-inch blocks being used with an inch of facing on either side. The interior partition walls are made of brick four inches thick and covered with plaster. The ceiling is also plastered in, the plaster being laid on metal laths, thus finishing the interior neatly and in accordance with fireproof construction regulations. The lighting is thus made more effective also by day or by night.

The roof is built up on trusses laid 10 inches apart, which rest on a 10-inch I beam, and the rafters project beyond the eaves. A very durable roof for this type of construction is made up of a six-ply tar and gravel roofing, laid on seveneighths-inch North Carolina pine matched roofing.

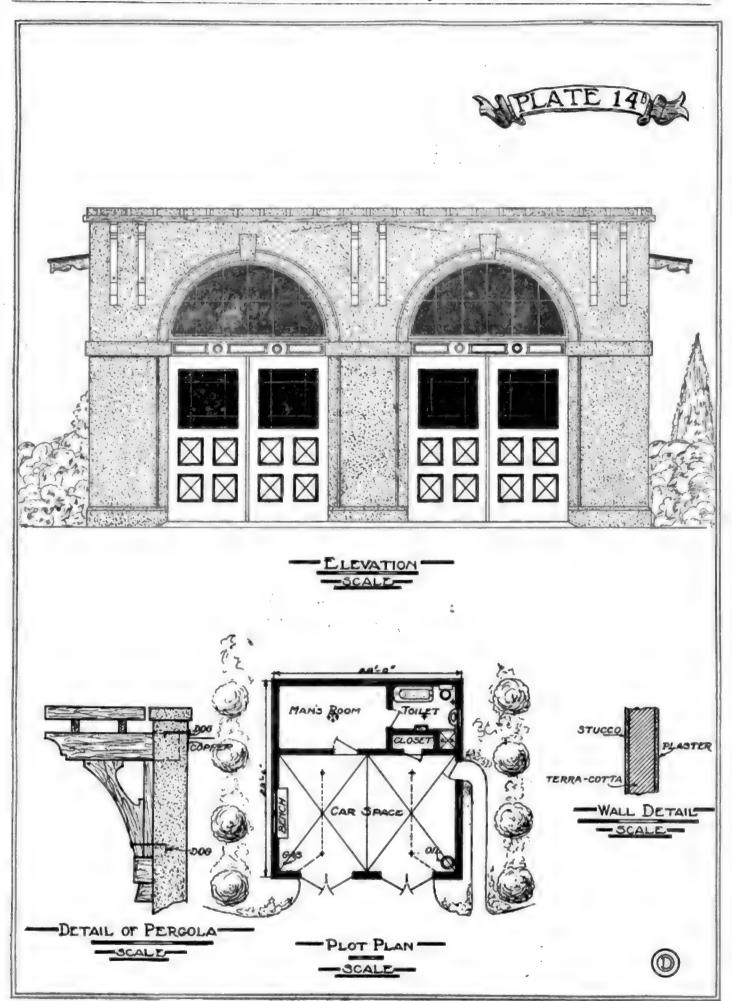
The concrete foundation wall should be a foot thick and extend below grade 31/2 feet. It should be made of one part cement, two parts sand and five parts coarse gravel or crushed stone. To preserve the fireproof feature of the structure a concrete floor should be used. This should be at least four inches thick, the first three inches of one part cement, two parts sand and five parts of coarse aggregate, and the surfacing layer of one part cement and two parts sand.

With the floors sloped and drains provided. it is a good plan to install an overhead washing system, which enables the chauffeur to do the work efficiently and with little loss of time. The piping for such an apparatus should be installed during the erection of the walls, so that the installation will not disfigure the interior of the

garage.

Attention is called to the detail of the pergola, an ornamental effect attesting the southern origin of the design and its primary intent for an estate in the south land or Florida, where the detail of a heating plant would be superfluous. Wall pipes may be supplied for heating from the estate heating plant in case of its adaptation to a more northerly location as is entirely feasible. The arms of the pergola, it will be observed, are set in the wall securely and held in place by dogs. These, with the projecting ends of the rafters, which are cut as shown in the plan, produce at once a quaint and striking architectural effect. Shrubbery arranged in accord with the design is a heightening influence well worthy of the outlay.

The natural lighting and artificial lighting layout insures a good illumination of all objects in the garage at all times. The large arch windows over the door may be hinged or unhinged as desired. Large windows in the upper half of each door assist the interior lighting, as well as add to the outward appearance.





Governor Whitman traveled purposely from the state capitol to the metropolis to be present at the opening of the National Automobile Show. He said he wished to emphasize the importance of the motor car in war time. His address gave evidence that he had studied carefully the methods of motor transportation in its relation to the movement of artillery, equipment and machinery for the army.

Making a sleeping car out of your automobile is one thing that is not permitted in Astoria, N. Y. A young man who had taken his best girl home from



the theatre had a case of engine failure on the way back. When he entered his car he was overcome with drowsiness while waiting for it to start, so he said, fell asleep and slept three hours. The police gave him a less airy bed for the rest of the night.

-:::-

San Francisco high school boys and high schools girls were able to earn a tidy bit of Christmas money in a membership drive made by the officials of the California State Automobile Association. The association's work in sign posting roads was pointed to as a benefit to every motorist, as well as its record of continuously fighting for better roads and highways.

Worcester, Mass., motorists are inclined to get together and wreak summary vengeance on the new traffic rules which will not allow a man to leave his seat to go into his own place of business for one minute to get his gloves or something else he may have forgotten. No stop is allowed by the curb long enough to allow a customer to enter for



the most trifling purchase. The police are inforcing the ordinance and intend to do so until the business men get it repealed.

-:::-

The last section of the concrete highways between Hamilton and Toronto has been finished and the road is completed. The road is 36 miles long, 25 yards wide at the Toronto end and 18 yards wide on the Hamilton terminal. Its construction was begun in November, 1914. The construction work required 167,000 barrels of cement, 125,000 tons of stone and 70,000 tons of sand.



The civil authorities of New Britain, Conn., presented something new in the line of civic investigations by forming a commission to sit on the police patroi and decide that it was not fit for use as an ambulance to continue to carry patients to the local hospital. The police board set up as a defense that it had been so hard pressed for funds that it had been impossible to have repairs made.

This is an excellent time to "make good" on resolutions for the new year.

One of the best is to decide to have a new car, and get it.

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From an old Spanish print comes the ever old, ever fresh lesson that when King Solomon said there was nothing new under the sun he was thinking clear beyond this present age of motor cars and far into the future. The old print

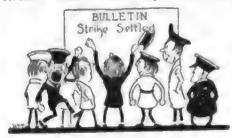


shows a primitive worm gear design applied to the king's car and with power furnished by plumed knights of the crank back in the middle ages. When one thinks of the worm gear antedating written history, one acquires a decided respect for Archimedes, Solomon, Columbus and a few other immortals who have left a decided imprint on the old terrestrial ball now wobbling with the weight of a fierce war on one side of it and general void and blackness on the other.

Pittsburgh dealers know that nightlighting is one of their big advertising assets. But they do not hesitate to face patriotic necessities and were in line to save fuel when the pinch came recently.

-:::-

The taximeters in Boston are busy again running up many slushy, muddy miles on the Hub's delightfully curving streets. After a labor dispute the taxi



drivers came to terms and it is now once more possible for a State street man in a hurry going up Beacon street to meet himself coming down again.

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One of the greatest surprises in an ice storm is to observe how many motorists go out or allow themselves to be caught out without tire chains.

-:::-

Poetic justice some times overtakes petty magistrates and village constables who take delight and thrive on arresting and imposing fines on automobile drivers. A magistrate and two constables in a New Jersey community were recently



convicted of maintaining a blackmailing conspiracy of this sort and were sentenced to terms in jall.

Taking over the operation of the railroads by the government accords more
recognition to the passenger car and motor trucks as transportation factors. The
removal of more passenger trains from a
schedule already greatly reduced was
one of Director McAdoo's first steps toward relieving railroad congestion at
terminal points. While railroad officials
might have disliked to take such action,
the government director does not hesitate to require that more passengers and
more freight be moved for short distances by motor vehicles on the ordinary
highways.

In these days when every householder is trying to mobilize enough coal to keep the furnace going at least Mondays, Wednesdays and Fridays, and getting through with as few shivers as possible Tuesdays, Thursdays, Saturdays and Sundays, many novel methods are employed to coax the fuel to the cellar bins. At least one Providence dweller solved

-:::-



the problem by hauling the fuel needed to his celiar in the tonneau of his \$5000 car. There is no priority order or papers patent to prevent emulation, but, as the old trapper used to say about a weasel, "the first thing to do is to catch your coal."

Six employees of the Reo Motor Car Co., Lansing, Mich., recently drove four Reo cars to Chicago, where they were delivered to the branch in that city. After successfully conducting the drive away the men enlisted in the truck section of the Ordnance Department.

























How Often Must You Clean Your Plugs? Ford — Overland — Studebaker Owners

The new AC Carbon Proof Plug will permanently rid you of plug trouble and keep your motor running on all cylinders all the time.

The Reason-

A deposit of carbon on the smooth surface of the porcelain is what causes short circuit with ordinary plugs. With the AC Carbon Proof plug the porcelain is provided with a number of ribs having saw tooth edges which attain a sufficiently high degree of heat to burn away the carbon. This keeps the edges free from deposits and breaks up any possible short circuit.

SPARK PLUGS

Mustandard Spark Plug of America

AC Carbon Proof
For Fords, Overlands
and Studebakers

Champion Ignition Company
Sole Manufacturers Flint, Michigan

paint is composed of ground rubber and lithophone (a zinc by-product) thinned with benzine. This keeps the light and air away from the rubber so that it will not deteriorate. The paint dries fairly hard, but when the tires are again put in use it will practically all wear off in a short time, leaving the rubber clean except next to the rim.

This same treatment should be given the spare tire, for when this tire is painted it will not be affected by water or ordinary wear. I have just had occasion to take off a new tire from the holder at the rear of my car which has been there for six months, and have scraped off the paint to see what effect it had on the rubber. I found that the rubber is just as soft and pliable as the day the tire was received.

My tires are kept on a rack in the basement, which is cool and dry and where they can be tested frequently. This has been my system for a number of years and I am more than pleased with the results which are shown in tire mileage.

WRAPPING TIRES FOR THE WINTER.

(H. D. Hoch, Lyon Station, Pa.) (Second Best Letter.)

Where a car is to be stored for a long time it should be jacked up so that the weight will not rest on the tires. The air pressure should be reduced to about half that of normal and kept away from the light and moisture. Strips of carpet or dark paper wound around the tires keep away both light and moisture and this should be done in all cases where they are to be left many weeks.

During the spare time in winter all of the cuts should be vulcanized or repaired. Wash the cuts with gasoline, cut away the rotted rubber and apply at least two coats of cement, allowing the first to dry before the second is applied. The cut should then be filled with raw rubber and the vulcanizer applied for 20 minutes. All rust should be kept from the ringpand plenty of soapstone used inside the shoes during the winter.

CHARGING A STORAGE BATTERY.

(J. G. M., Westport, Conn.)

Will you kindly give me directions for charging two sixvoit, 120 ampere-hour batteries from a 110 voit generator having an output of 16 amperes? Can I use the whole 16 amperes for charging the batteries?

As a general rule the batteries are marked with the starting and finishing rates of charge in amperes. The starting rate of charge should never exceed one-eighth of the total ampere-hour capacity of the battery, while the finishing rate is usually about one-third the starting rate. This applies to a 12-hour charge.

If you are charging the batteries yourself and have a constant source of power, we would suggest that you charge them at the finishing or 24-hour rate, which should be approximately six amperes. Under no conditions should you load the whole output of the 110 voit 16 ampere generator upon the batteries at one time.

For charging under the 24 hour rate, six 32 candlepower carbon filament lights should be connected in the circuit in parallel arrangement. From the positive pole of the generator run a wire to one pole of a double throw switch, and connect the corresponding pole of the switch with the positive pole of the storage battery, connect the two batteries in series, that is, the positive of one with the negative of the other.

From the negative pole of the second battery run a wire to one side of six light sockets, and from the other side of the light sockets run a wire through the switch to the negative terminal of the generator. As the lights are put into place the amount of current passing into the battery can be increased at will.

Turn on the switch after the generator has been started and allow the batteries to charge on the six amperes until a voltage reading fails to show a voltage rise over a period of one-half an hour. At no time should the temperature of the electrolyte rise above 100 degrees. If it does, one or two of

The National

Auto Show

Under Auspices of National Automobile Chamber of Commerce, Inc.

Jan. 26—Feb. 2 at Chicago

Four Hundred Exhibits of Cars and Accessories

S. A. MILES, Manager

7 East Forty-Second Street, New York City

the light globes should be removed until the temperature drops.

If it is desired to charge the battery at a higher rate you may add one 32 candle power light for each additional ampere desired. If the charging rate is to be 10 amperes the total number of lights will be 10. The current is allowed to pass through the 10 lights until the battery gases freely and the temperature of the electrolyte commences to rise, then the number of lights should be decreased until the finishing rate of six amperes is reached. The rise of voltage will oe gradual until the peak of voltage has been reached. At this point the voltage will remain stationary for at least half an hour. The charging should then be stopped.

KNOCK IN FORD CAR. (J. A. S., Rochester, N. Y.)

t am having considerable trouble with my Ford 1917 car. When I run the car up a hill I frequently notice a puff of smoke, then a continued pound which I cannot stop, even by retarding the spark. I have had the carbon cleaned from the cylinders and am now grinding the valves. Can you tell me a possible reason for the pound or knock? What is the valve setting on this engine?

There are quite a number of possibilities for the trouble with your Ford car. First, examine the gasket between the cylinder head and block; in fact, we would advise you to install a new one, liberally covered with a paste of graphite and oil. This is to prevent water leakage from the jackets into the cylinders. Under ordinary conditions this leakage may not be noticeable, but at high engine speeds or under pressure there may be a leakage of water into the cylinders. If the leak is large it would fully account for the knock which you notice.

Make a careful examination of the valve setting. Be sure that the clearance between the tappet or push rod and valve stem is not more than 1/32 nor less than 1/64 of an inch. The correct clearance should be about 3/32 of an inch when the engine is cold. This is very important.

The writer has been called to inspect a Ford machine which developed a peculiar knock and found that the spark plug electrodes extended into the valve chamber so far as to interfere with the valves. In this case the engine action was extremely peculiar. Besides the knock there would be at times a skip, sometimes a backfire, due doubtless to the fact that the intake valve wedged open. There was a noticeable lack of power. Inspect your engine for the same conditions.

Inspect the valve setting and see that the exhaust valve closes when the piston in that cylinder is at top centre. Next check over the timing. It is possible that the timing rod has been sprung or bent so as to retard the timer. With the spark fully retarded the coil should begin to buzz 1/16 of an inch from the top centre.

Are you sure that the piston rings are tight? Be sure that the compression is good and that the cylinders are not scored. Measure all of the cylinders to see that they are round and not worn oval at any point. The installation of a set of leak proof rings may eliminate the trouble.

If you are using any kind of a water vapor attachment on the carbureting system, inspect it and be sure that it is not delivering too much water to the cylinders.

PLACING OF PISTON RINGS. (O. W. O., Worcester, Mass.)

Will you kindly give me advice as to the proper placing of piston rings in a Packard twin-six engine? By this I mean the correct position of the joints in relation to the inside and outside of the blocks.

You did not say in your letter whether you were installing the regular Burd leak proof rings, or the ordinary type of bevel cut rings.

As far as leakage of gas is concerned the position of the joints in a Burd ring makes no difference in efficiency, for there is no more chance for leakage at the joint that at any

other point in the ring. The question of weight is the only consideration, though even this factor is negligible.

From theory, both the top and bottom rings on every piston should be so placed that the joints or heaviest part is at the centre pointing toward the inside of the V, while the centre ring should be placed with the joint on the opposite side. While in operation the rings will gradually turn on the pistons until all joints, or heaviest parts, are on the outside or lowest point. This revolving action will result in even cylinder wear. As we said before it makes but little difference, however.

Where the plain bevel cut rings are used the cuts should be spaced in thirds. The top ring should have the cut on the inside of the V (both blocks), the second and third spaced at 60 degrees from it and from each other. This arrangement gives the maximum difference between each ring and a maximum amount of time is required for all cuts to register as the ring revolves in action. These rings are heaviest at the point opposite from the cut and will finally come to rest with all cuts on the inside of the V.

The spacing of rings on a four-cylinder upright engine differ slightly from that of a V type engine in that there is not so great tendency for the rings to revolve in the former. In upright engines general practise is to space the rings at 180 degrees, thus bringing the cuts in the top and bottom rings together, with the middle on the opposite side. (In a threering installation.)

If the pistons were fitted with four rings we would suggest that the first ring be placed with the joint uppermost (in the V), the second with the joint spaced 45 degrees to one side, the third 45 degrees to the other side and the lower with the joint at the bottom.

INSTALLING NEW PISTONS.

(J. L. W., Mount Oliver, Pa.)

The second speed bothers me a great deal because it slips out of mesh very easily when engaged. Can you tell me the cause and remedy for this?

Before you have the cylinders rebored we would advise you to make a series of careful measurements to determine whether they are out of round or not. With the excessive supply of oil, which you claim the cylinders have been getting, it does not seem possible that the wear should be so great as to require reboring in so small a mileage.

The cylinder regrinding or reboring operation is too expensive to attempt needlessly, then, too, every time you have the cylinders rebored the walls are decreased in thickness and the engine depreciates to a certain extent. Of course if the cylinders are out of round they should be reground or rebored and new pistons installed.

Even with a two-ring installation there should be no trouble from binding at the skirt if the piston is properly fitted to the cylinder. Usually about .001 of an inch for each inch of piston diameter is allowed for clearance between the piston and cylinder, for when the engine is heated the piston will expand so that this clearance is reduced greatly. We would advise you to fit your pistons .003 of an inch smaller than the bore.

Three rings above the wristpin and one below is considered good practise. In many cases no provision is made in the piston for lubrication, the splash upon the cylinder walls being sufficient to fully oil the contacting surfaces. Some engine magnifacturers turn a slight bevel edge, having a face of about 1-26 inch, on the lower edge of the third ring from the top of the piston, this being the ring above the wristpin. Through the piston wall and at right angles to the bevel on



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small wire leading from the side of the starting switch that is connected with the positive battery terminal. This small wire is connected with the motor generator and to it is connected a wire leading to the lighting switch. Disconnect the small wire from the starting switch and connect it with one pole of the ammeter; connect the other ammeter terminal with the starter switch, completing the circuit as before. Turn on the lights and if the ammeter indicates "charge," reverse the connections.

THE REO CAR. (Continued from Page 15.)

units should be tagged and removed. The four bolts fastening together the two portions of the universal flange should next be removed and after the engine retaining bolts have been taken out the engine may be lifted from the chassis.

To facilitate the work the generator should next be unclamped, the generator coupling unbolted and the generator, with ignition unit, taken off.

Examination of the Pump.

The circulating pump body should next be taken off. This casting is tastened by seven nuts on studs from the rear. Then the body has been removed the impelior is exposed and after removing the nut on the end of the shaft the impelior, which is keyed to the shaft, may be pulled off with a wneel puller.

The pump cover, which is retained by two nuts, should next be supped on. In order that this may be accomplished more easily it is a good plan to loosen the stuffing box nut. The starting ratchet, which is pinned to the crankshaft and the ian drive pulley, which is clamped to the shaft, should next be removed and the front timing gear case cover removed. The pump drive gear should next be pulled from the shaft and the shaft examined for wear. Excessive play in the pump shaft should be compensated for, either by the removal of the shaft or the bushing. Unless there is wear at this point it will be unnecessary to remove the shaft or coupling.

Removing Pump Shaft.

To remove the pump shaft, unscrew the nut on the end which retains the generator drive flange and after having driven out the pin holding the flange to the shaft remove the flange and friction disc. The shaft may then be removed from the front and the shaft bushing driven out toward the front.

Practically all of the repairs to the oil pump may be made by the removal of the cap at the bottom and outside the crank case, or by taking out the plunger. This member is fastened to the eccentric by a pin which is retained in place by a cotter pin. After the cotter pin and eccentric pin have been removed the plunger may be freed from the eccentric and removed.

Disassembly of the Clutch.

By inserting an iron Y bar between the engine and flywheel and hooking a heavy piece of wire around the flywheel to serve as a fulcrum, the heavy clutch springs may be compressed and the retaining nuts removed. This will permit the taking out of the spring bolts and the removal of the clutch cover, or so-called thrust member, together with the clutch plates and roller bearings. With the clutch out of the way the large nut on the end of the crankshaft should be taken off and the flywheel pulled from the shaft. Unless absolutely necessary the hub should not be unbolted from the flywheel. The holding bolts should be examined, however, and made tight if necessary.

The first and second camshaft bearings are retained by set screws, while the third or last is retained to the end of the crank case by cap screws. This last bearing need not be disturbed unless it shows evidences of wear. The other two must be removed before the shaft can be taken from the engine. Both the timing gears are driven on to their respective shafts and kept from turning by keys. Unless they show signs of wear or are loose on the shafts they need not be removed.

If it is necessary to remove the crankshaft the timing

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These national periodicals are printed in the big cities—and the first zone, the cheapest zone, is in or near those cities; there are many educational opportunities near cities, and the cities will read anyway. Small towns and distant districts depend to a large extent upon periodicals; thus this law increasing periodical postage where it is most needed shuts off opportunity where needed. It penalizes periodical readers.

Repeal this law. Repeal this FIFTY TO NINE HUNDRED PER CENT. periodical postage increase. Sign the petition below and mail it. Put a cross mark in the square—save the periodicals and the work that they have done and are doing for national education and patriotism.

SIGN BELOW

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The postal amendment passed by the last Congress increasing the postage on periodicals from FIFTY TO NINE HUNDRED PER CENT, will throttle or destroy our periodicals at a time when the widest and most extensive circulation of publications is essential to the patriotism, education and upbuilding of our country.

Therefore, I the undersigned, do most earnestly demand the repeal of this burdensome periodical postage amend-

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HIRTY-EIGHT per cent. of the automobiles now in use are owned by persons living in towns having less than 1000 inhabitants, according to acceptable statistics. This showing that more than one-third of the great mass of cars used in this country supply rural and suburban dwellers with quick transportation pure and simple sufficiently refutes the argument that an automobile should be classed as a pleasure vehicle. Greater recognition is given every day to the fact that in cities or outside of cities the motor car is first and foremost a utility. It has liberated the city workers from the close discomforts of flat dwelling and it has broadened the man in the country so that, with its aid, the outside world has become his neighbor. It has created wealth, health and happiness in a degree that no other product of the new century can match. Without a doubt this will be a great year for the automobile.

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This is the answer: Sell Dyneto Light and Power Plants in your community. Think of the many prospects within a few miles of you. They all want light and most of them have the purchasing power.

The Dyneto Light and Power Plant is easier to sell and offers more profit than a low priced automobile. Hundreds of garage men have adopted this plan of increasing their profits.

You will make many sales right in your garage. Your plant will pay for itself in lighting your garage and electric sign, running your air pump and lathe, or in charging batteries at a remarkably low cost. You can use

it as a demonstrator to customers coming to your garage. But do not be content with that. Mount another plant on the back of an auto or on a trailer and send your men out after business.

Dyneto Light-and-Power Plants consist of a gasoline engine (gas or kerosene, if preferred), generator, switchboard and standard 16-cell storage-battery outfit. The engine is self-starting from the battery. Belted to a lineshaft the engine furnishes power for pumping water, running separator, milking machine, churn and for other power duty, while charging the batteries for light at the same time.

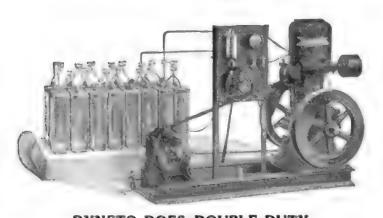
The Dyneto Plant is simple, trouble-proof, easy to install and care for. It can be furnished without engine if your customer already has an engine.

Plan to increase your profits by going after this business good and hard. Write to us today about the necessary steps.

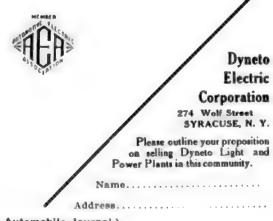
DYNETO ELECTRIC CORPORATION

SYRACUSE

NEW YORK



DYNETO DOES DOUBLE DUTY
LIGHT AND POWER



PAIGE

The Most Beautiful Car in America

"ALL SET"

January sales have given the lie to December alarms. The two big shows—New York and Chicago—have told their story—a story of enthu siasm, restored confidence and real business. There isn't a motor car dealer—at least an intelligent one—in the country today who doesn't know that the industry will "carry on" tranquilly, profitably, irresistibly in 1918.

Irresponsible newspaper stories were mainly to blame for the ridiculous alarms of November and December. When the government and the real leaders of the motor car industry got together, it didn't take long to come to an understanding. The government today knows precisely what the motor car manufacturers can do. And the motor car manufacturers know precisely what they are going to do.

That alarm—although perfectly needless—was by no means a bad thing for the industry—or for you. It proved one thing—a vastly important thing—and it was proved by the people of this country to Washington's satisfaction. It proved that the motor car is not a joy-riding luxury any longer—but an indispensable utility—a means of swift, economical transportation necessary to maintain our business efficiency—at a time when it must be maintained. Remember that in your own selling.

As a result the motor car is here to stay—which means that sales are here and here to stay.

However, we must not forget this: While the American people in 1918 are going to buy motor cars liberally, they are also going to buy them intelligently. They are going to buy only the best cars, the best value, the best service and buy them only from the best companies.

Never in the history of the industry has it been so imperatively necessary for the dealer to look well into the foundation of the company whose product he sells, whose policies he represents and on whose wisdom and strength he is to live or perish—as it is now.

We don't send our boys "over the top" without an aviation corps to tell them what they're up against and direct their fire; withoùt artillery to smash the opposition; without reinforcements to help them hold their gains; without guiding wisdom and heroic assistance to see them through to victory.

The Paige is ready to do that in this War Year of 1918 for all Paige Dealers. Paige Cars for everybody and all Paige Cars will be sold. We are "all set."

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, MICH.







used, and should be used in liberal quantities so that all dirt on the finished surfaces is either washed entirely off or can be removed without pressure by a soft sponge. This treatment should be as carefully followed in cleaning the wheels, axles or other painted or finished parts as in the case of the body. There are very good dressings on the market for preserving tops, and the leather material used in a car, all of which judiciously used will help to preserve the original appearance and value of the car.

Dust constantly driving up against the body of a motor car has, of course, the effect of a sand blast on a reduced scale, and will eventually destroy the finish, in which case it is always best policy for the owner to have the finish restored by a competent body painter rather than to slap on a couple of coats of paint and varnish over the old coat, as the job will be unsatisfactory and will not add anything to the value of the car, while a well finished job will go a long way toward re-establishing the machine's original value in a prospective purchaser's eye.

It may be possible to convince a purchaser that the machinery is all right even if the exterior is shabby, but the reverse proposition is far easier and more profitable in the end.

Overloads to Be Avoided.

The owner would not overload the springs, as in doing so he is not only damaging them, but also the tires, frame and is subjecting the engine, clutch, transmission and every other moving and working part to abnormal strains and knocks. He should recognize the fact that if his car is designed for five passengers of an average weight of 160 pounds each, or to carry a total weight of 800 pounds, the engine, transmission, clutch, running gear and tires were chosen to perform their proper functions under average conditions with such a load. He would not reason that just because he could go along the level or down a hill with an additional 300 pounds of weight that his car was capable of handling it without injury to any of the parts. He would keep the proper pressure at all times in his tires and his springs lubricated so that the ruinous road knocks and vibrations would not reach and tend to destroy or crystalise the moving metal parts that are so carefully adjusted.

In starting and stopping his car he would be conscious of the fact that the law of inertia and momentum were constantly working, and that too rapid acceleration of the speed, or too sudden a stop, were equally injurious to the power plant, transmission, clutch, as well as the springs and also increased tire wear.

Once a year at least the car would have a thorough overhauling and all parts replaced where the wear had reached a point causing rattles, vibration or loose running to injure connecting or dependent parts.

All the evils of car neglect, however, do not come with its operation. Many, in fact, some of the most serious causes

of rapid depreciation are those resulting from improper preparation for storage, and negligent housing. In the first case the prudent motorist, if housing his car in a public garage, would not select one where the employees were careless, and other machines coming and going were allowed to bump into other cars indiscriminately when driving in and out; where there is no heat in the winter time or means of properly washing a car. When storing a car for the winter all parts not covered with paint or finished to prevent rust, should be thoroughly smeared with heavy grease and care taken not to get any on the exposed painted parts, as it will discolor the finish. The water should be drawn from the cooling system, the tires removed and taken into the home or cellar where an even temperature will prevail throughout the period of storage. as extreme changes of temperatures over a long period rapidly deteriorate rubber casings and tubes.

Packard Prices will Advance March 1st

All Models Affected and Driveway Charges May Be Added After That Date.

The Packard Motor Car Co. has amnounced an advance in the price of all models, to become effective March 1. The model "3-25" will be advanced \$250 and the model "3-25" will be increased \$200. Additional costs, however, might accrue after that date if it becomes necessary to drive the cars overland from the factory, but up to that time only \$42, the regular freight charge will be added.

The new price on model 3-25 roadster, five-passenger touring and seven-passenger touring cars is \$3950, and on model 3-35, seven-passenger touring, the new price is \$4300.

MOTOR CAR EXPORTS \$80,000,000

Over 75,000 Vehicles Were Shipped To Foregn Lands During the Past Year

THE United States is the world's market for motor cars and trucks at the present time. During the year just closed the United States shipped abroad more than 60,000 passenger automobiles, valued at more than \$48,000,000, and 14,000 motor trucks, worth over \$30,000,000, not including the cars and trucks bought by the United States government and shipped to our army in France. These 75,000 vehicles, worth \$80,000,000, represent less than four per cent. of the total production of cars in America and about eight per cent. of their gross value.

It is expected that after the war, when export embargoes and import prohibitions have been removed, so that commerce may return to normal conditions, there will be a great increase in the demand for motor vehicles throughout the world and that with proper preparation and co-operative effort between the manufacturers and the government agencies, much new wealth will flow into the country in payment for American materials and labor embodied in more than \$100,000,000 worth of motor cars yearly.

Among recommendations made by the N. A. C. C. export committee are:

That the Bureau of Foreign and Domestic Commerce in Washington increase the attention it is giving to investigation of foreign markets for motor vehicles and issue periodical reports relating to the automobile trade in foreign countries.

That the N. A. C. C. authorize a delegate to represent it officially at the National Foreign Trade Convention to be held in Cincinnati next April.

That the N. A. C. C. gather informa-

tion relating to available highway improvement data with a view to sending such material to countries where road construction is in a backward state.

That the N.-A. C. C. undertake the preparation of a table of equivalents in foreign languages for standard technical automobile terms.

Tom O. Jones, special agent appointed by the Bureau of Foreign and Domestic Commerce to investigate the market for motor vehicles in the Far East, on the eight months' trip from which he has just returned, reports there are about 2400 automobiles in Japan now, and during the first nine months of last year 600 had been imported as against 218 during all of 1916. Japanese roads are very narrow and the bridges weak, but the army is using some motor trucks and the government is spending \$2,000,-000 on the road from Tokio to Yokahama and ordered the provinces to improve their roads and bridges. Japanese army engineers brought an American truck over from Tientsin, China, and copied it at a government arsenal, but had so much engine trouble that the idea of manufacturing trucks in Japan has been given up and the government is now buying its trucks in this country.

Owing to the unsettled political situation in China, the Chinese hesitate to buy cars now because they are afraid they may be taken away from them. There are practically no roads in China outside of the cities and foreign concessions, but the governors of the provinces are beginning to realize that their districts are handicapped on this account and now propose to build roads to connect towns with the railroads.





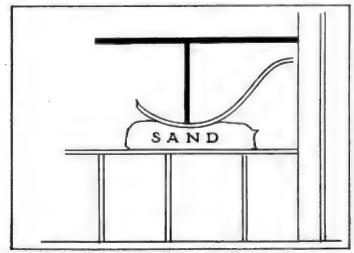
As far as repairs are concerned, tread or side wall rubber may be replaced very easily, because the strength of the tire is dependent upon the fabric or carcass. When the fabric begins to break, however, the tire is in a serious condition. Destruction of fabric is due not only to rotting from moisture, but also from stresses caused by contact with sharp points or edges. "Climbing" curbs would bring about such a result and though the break would not be evident from the outside, the cotton fibers or cords would be stretched and weakened at the point of greatest stress. A careful examination of the inside of the shoe will expose such a break, which should receive immediate attention.

Clean the fabric and rough it up with a piece of sandpaper, then apply three coats of cement, allowing each coat to dry thoroughly. Now strip off the tread from an old tire and cut out a section of the fabric measuring about 12 inches in length and wide enough to cover the inside of the shoe being repaired. Clean this patch and give it three coats of cement, allowing it plenty of time to dry between the coats. Cement it into place and allow it to dry at least 24 hours.

Where a break extends through both the tread and carcass a repair as directed in the preceding paragraph in addition to the regular tread repair will often be sufficient to increase the tire mileage. If the break is large, however, the shoe should be taken to a vulcanizer.

Guarding Condition of the Rims.

There is one more item that does much for tire mileage, that of rim condition. At least once a season all tires should be removed from the rims and the rims thoroughly cleaned,



Pressure for Reducing Bends May Be Obtained by Using a Lever and a Stick, with a Bag of Sand Beneath the Fender.

all rust removed and the rims painted either with special iron paint or with a thin mixture of orange shellac and lamp black.

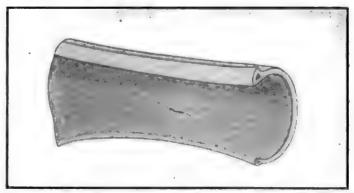
Because of the fact that a soft tire will have a tendency to pump water inside the shoe, a periodic examination should be made of the inside and all moisture dried out. In applying soapstone to the inside of the tire be careful not to use too great an amount or the end will be defeated. Just enough of this powder should be used to form a smooth coating over the shoe fabric and reduce internal friction.

Much of the tire and tube repair work can be done with one of the small hand size vulcanizers now on the market and the car owner is advised to purchase such a device, since the saving or salvaging of tires and tubes will soon pay for such a device.

Uncured rubber or repair gum may be vulcanized into place and forms a repair that is usually permanent. Holes in tubes as large as an inch in diameter may be repaired if one possesses a small vulcanizing outfit.

Patching Holes in Tubes.

For small holes in tubes an outside patch answers the purpose, but where the hole is half an inch or more in diameter an inside patch should be applied. Trim the edges of the hole smooth and clean and buff back from the edges inside the tube for a quarter inch all around the hole. Place a prepared patch made of a layer of cured rubber and a layer of



A Break in the Carcass May Be Unnoticeable from the Outside, but Will Soon Cause a Blowout Unless Repaired.

uncured rubber inside the tube and over the hole, covering the hole and about three-quarters of an inch larger all around. Moisten the patch and press it against the side of the tube by placing the tube on a flat table.

The hole itself should then be filled in with raw rubber just the size of the cavity and the small vulcanizer applied. To prevent the tube from sticking to the vulcanizer a piece of holland or muslin should be placed over the break.

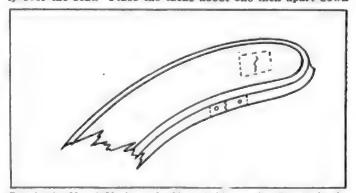
Points About Top and Upholstery.

Next in importance to the condition of the tires comes the appearance of the top and upholstery. Nothing detracts so much from car appearance as torn leather, with the hair filling showing through or bulging out through the breaks.

The ordinary method of repair adopted by the average car owner consists of cementing a leather patch over the torn place, either in the top or cushions. This is at best only a temporary repair and as soon as the patch tears away the condition of the seat or top is worse than before. To make a good repair the upholstery should be lifted by removing the upholstery nails or binding until space enough beneath permits the insertion of a large piece of heavy duck, leather or imitation leather. The piece beneath the break or in the cushion should be three or four times as large as the hole. Cement this repair piece to the underneath side of the leather and do the same with the patch on the outside of the break. With fine carpet thread sew all around the patch with fine stitches and, when completely fastened, go over the patch and leather with a good leather renewer, obtainable at practically any automobile supply house. Whether the patch is on the top or upholstery, water proof glue or cement should be used so that the elements will not dissolve the

Where upholstery is badly torn new imitation leather may be used for covering and the amateur repair man may be able to do a very satisfactory job by using the French plaiting method. As a general rule the old covering had best be left on the seat or back and the new covering applied directly over it, the old will add strength and hold the springs and filling in place while the new is being applied.

If the old covering is fitted by plaiting the problem is simple. Starting at the right side of the seat, stretch the leather tightly and tack it down along the sides, stretching it smoothly over the seat. Place the tacks about one inch apart down



Breaks in Metal Mudguards Should Always Be Patched; the Patches Should Be Either Soldered or Riveted to the Metal.











NO SHORTAGE OF GASOLINE IN U.S.

Petroleum War Service Committee Gives Assurance That Stock of Motor Car Fuel is Really Increasing

THAT there is no shortage of gasoline in this country and that the stocks of gasoline are increasing is the reassuring announcement made by the Petroleum War Service Committee, which has compiled its reports on the situation and the secord of the past year. This does not mean that consumers are invited to be wasteful of the precious fuel, or to use it unnecessarily, as the big demand for gasoline incident to the war will not develop its full proportions until the American expeditionary forces start operations in France. At that time the situation might have an entirely different complexion regarding the supplies.

"There is no shortage of gasoline in this country," says the committee. "As a matter of fact, as a result of the light domestic demand incident to the winter weather, the stocks of gasoline are increasing and will further increase before the heavy summer demand is encountered.

"While there is an increasing demand abroad for gasoline for use by our own army and navy, as well as our allies, the limiting factor there is shipping tonnage. All the gasoline is being forwarded for which ships are available. Experience and inquiry make it clear that the petroleum industry in America can and will supply all the increased demand for oil products for the war, provided sufficient tank steamships can be obtained. It is estimated that in 1917 not over 25 per cent. of the gasoline produced in this country was exported. That fact should be reassuring to any one who doubts this country's ability to supply the war requirements of our own and our allied governments for this important product.

"The need of immediate importance is that there be no relaxation in the production of fuel oil. This material, 'liquid fuel' as it is often called, is used by the oil burning vessels of the navies, by practically every industrial plant engaged in the manufacture of munitions, shipyards, gas plants, and even by some of the railroads."

REO CALLS FOR BRAKES ON DOLLAR PATRIOTISM.

"If you have noticed a pleasing absence of appeals to 'patriotism' in Reo automobile advertising, it is intentional," says General Manager Scott of the Rec Motor Car Co.

"I sometimes wonder at the affrontery of business men who use so sacred a thing as our national patriotism to push the sale of their wares.

"Seems to me it is prostituting man's finest emotion to a very ordinary, if not a base, purpose.

"We are just as alert to further the

reputation of the Reo product as any other manufacturer can be, but we do not believe in stooping to such methods by telling the buyer that it is 'your patriotic duty to buy, etc., etc.'

"Nor do we believe that as a firm it is right for us to flaunt before the eyes of everybody the little part we are so fortunate to play in helping Uncle Sam along with his war plan.

"That is our patriotic duty and our privilege—it is as unseemly to advertise the fact as it would be to exploit personal charities or to press agent one's activities in the interest of public wel-

"I have been astounded to note that some concerns that are manned by individuals who, in private life, would seem to be above such methods, have made the most flagrant abuses of the word 'patriotism' in this form.

"We Reo folk hope to do our partif it were not for violation of what I have just said above, might specify how and in what directions we are and have been doing our part-but we do not feel that we are any more entitled to public patronage on that account.

"In fact, if somebody else makes a better automobile we would feel that we were less entitled to his patronage or his confidence.

"If the quality of the product itself is sufficient grounds for exploitation in peace times, surely we can adhere to these same qualities in war times and without appropriating to our own little personal advantage the quality of patriotism that all Americans feel and which, like religion, can be played upon by those who are sufficiently irreverent to do so."

MUSKEGON PLANS SECOND SHOW.

Automobiles, trucks and accessories will be exhibited at the second annual automobile show to be held in Muskegon, Mich., during the week of Feb. 25-March The city, which is the centre of large automobile manufacturing enterprises, has enjoyed a remarkable growth in the past few years and at present is experiencing an unprecedented wave of prosperity, as most of its industries are flooded with orders and working overtime.

GOVERNMENT CARS NEED CARRY NO LICENSES.

The War Department has made a ruling that all motor vehicles owned by the government or operated exclusively by officers or employees of the government, may be used for official purposes without procuring state automobile licenses or identification tags. The machines will, however, bear metal plates issued by the government, or the corps by whom purchased, giving the initials of the department, the letters U.S.A., and the number of the vehicle.

HAYNES PASSENGER CAR SURVEY.

More than 80 per cent. of the passenger automobiles in America are indispensable to business, according to data gathered in a nation wide investigation just completed by the Haynes Automobile Co., Kokomo, Ind. A large part of the remaining per cent., it was disclosed, are essential to the personal efficiency of their owners.

The average business could not be carried on under war time conditions, at war time speed and with war time economy of operation without the passenger automobile. Even the reports from those who do not use their own cars regularly for business recognize the necessity for the so-called "pleasure car."

The public is accustomed to look upon the physician's use of an automobile as urgent. But it has preferred to class cars owned by persons of other professions and business as purely pleasure vehicles.

"We were convinced in our own organization that a large majority of the cars we were selling were being used in business, but it remained for this investigation to make us realize the full extent of their business importance," says A. G. Seiberling, general manager of the Haynes Automobile Co.

A letter asking for complete information regarding the individual's use of his passenger car was mailed to 1000 owners living in all states. The names were taken at random from a list of Haynes owners, including city and rural districts. All kinds of business and all professions were represented. The letter was impartial, simply explaining the situation and asking that a post card be filled out and returned.

Farmers, jobbers, manufacturers, buyers, salesmen, physicians, attorneys, contractors, hotel keepers, executivesthese are representative of the businesses which find the automobile a necessity according to the replies.

Car Adds \$350,000,000 to Crop

Significant to American thrift and history is the fact vouched for by one of the bright men who move the automobile business that the possession of cars and trucks by men of this country forced them in the last year to add 10,000,000 acres to the cultivated soils of the United States. That is, the power of

the cars, as compared to the power of the horse, gave the men strength and time to till that much more of the soil. Presuming that the 10,000,000 acres produced crops which sold for a value of \$35 an acre, the motor power machines enriched this country by \$350,000,000 in that one year.



ADVANTAGES.

Cooperative buying is available for the member. Aid in securing reliable and competent chauffeurs, in recovering stolen cars and lost articles is given. Legal advice and touring information is given. All of this valuable service to the members made possible through their cooperative support as manifested and exercised through the association. Besides, they are promoting national highways and good roads everywhere.

"union there is strength" is the one upon which this great prosperous and powerful country was founded and upon which it has been perpetuated. Every man with property should be quick to recognize this as the underlying cause of his freedom and prosperity, and should utilize the idea it extends for co-operation in protecting his rights and in securing other benefits that can often be gained only in this way and at less expenditure than is ever possible through individual efforts.

Many motorists vehemently denounce incursions upon their rights and restrictions of their liberties and their wail is as ineffective as if shouted in a dungeon or on a mountain top unless it is backed up with the support of others of the same opinion. They fail to see the remedy for their troubles that is open through the influential motor association, which through its large membership and representation has influence in city, state and national matters, or else, if acquainted with the benefits to be derived from organization, feel as long as some one else is taking care of the matter and standing the expense they need not bother themselves, but can sit back and enjoy the benefits without expense or trouble. It is true that all motorists share some of the benefits secured for motorists as a whole by the motorists' association, but the non-member does not receive all the benefits accruing from that association in such things as personal attention and service. Yet he is depriving the organization from a support which would strengthen it and enable it to obtain even greater benefits for himself and others.

There are numerous advantages enloved by the motorist who is a member of an association, other than those of a nature affecting directly the operation of his car under legal limitations. He often, through no fault of his own, is brought into court to answer to charges of violations of the law. A member of the National Automobile Association anding himself in such a situation need only notify the nearest legal representative of the association, and he is represented in court free. He is saved the trouble, time and expense of hunting up an attorney to handle his case and is also assured that his representation in the courts will be by expert talent. The association has 70 odd representative attorneys in various cities and towns

throughout New England who can be called upon in emergencies when it is impracticable to call upon the legal department at headquarters in Boston.

Every motorist who finds use for his car over extended trips knows the value of road information, so that he can plan his itinerary in advance and not meet with many unexpected detours and impassable road conditions, necessitating delay and unnecessary discomfiture. To acquire this information alone as an individual he must invest in the neighborhood of \$20 to secure the necessary books and maps and then must do his own planning, while as a member of the N. A. A. he not only receives an up-todate tour book of New England, giving maps and itineraries, which makes it easy to trace routes throughout that territory, but also receives, twice monthly, road information through the association's department in the Automobile Journal, and he may also obtain special itineraries upon application, for trips to any point in this country or Canada.

In the Automobile Journal, to which he automatically becomes a subscriber when joining the N. A. A., the member gets extended touring information and special tours, besides a general fund of information covering things in motordom in general, including expert advice on how to care for and repair his car; descriptions of the latest models and accessories that add to the comfort and convenience of motoring; plans for various types of garages. The member also automatically becomes affiliated with the National Highways Association, which is the greatest organization of its kind in the country, having more than four score representative organizations working constantly for the advantage of the motorist by urging and securing the construction of national highways and good roads everywhere. The N. H. A. issues colored plate maps, which are free to members of different sections of the country, showing the main highways that cross the country and those running north and south, as well as the connecting highways.

The cooperative idea of buying is also available for the member and he can secure the discounts made possible through the quantity buying plan. Along this same plan of service the association gives expert advice relative to insurance companies, policies, rates requirements and procures reliable policies in responsible companies.

Aid in securing reliable and competent chauffeurs, in recovering stolen cars and lost articles is also given the member and this assistance is made efficient through the extensive scope of operations made possible by organization.

All of this valuable service to the members is made possible through their cooperative support as manifested and exercised through the association, which is an organization looking constantly after the general interests of the member as a motor car owner, besides helping along a most patriotic movement,

INSIGNIA.

Affiliation with such a movement should be a matter of pride with every motorist aside from the direct benefit he derives personally, and his identification with the association, which should carry with it a certain respect from everyone, is denoted by the beautiful insignia plate after the design by the celebrated sculptor, Bela L. Pratt, which is given to every member to be placed on the front of the radiator of the car.

that of promoting national highways and good roads everywhere. This is not only an unselfish devotion to the interests of all motorists, but is for the general national welfare, as it will do more toward developing the wonderful natural resources of the country than any other movement.

BOUND TO SURTAX BAY STATE AUTOS.

Henry B. Endicott of the public safety committee of Massachusetts has a bill "to provide additional revenues by the imposition of temporary surtaxes on motor vehicles and operators thereof."

This is the second measure that has cropped out for the purpose of singling out the motorist unfairly as a means of raising revenue without making any attempt to levy against many other things that are of a less serviceable nature and which could lay no claim to being a practical necessity, such as the motor car has come to be recognized by men who are conducting the war.

The measure would impose on all automobiles, except commercial vehicles and such as are registered by manufacturers or dealers, the following additional taxes: Five dollars if the present fee is less than \$15, otherwise \$10; on all motorcycles, \$1. On the first five vehicles registered by a manufacturer or dealer, \$5, and \$1 on each additional car.

DON'T OPPOSE GOOD ROAD APPROPRIATIONS.

In a "War Time Decalogue for the Motorist," issued by President C. H. Larson of the Motor Club of New York. he gives 10 commandments as a series of "Don't" for automobilists, one of which is as follows:

"Don't oppose the expenditure of municipal, county, state or federal funds for the building of roads. They are a vital part of adequate military equipment and preparation."

Such advice is well founded and is supported by no less authority than the man who built the Panama Canal, Maj.-Gen. George W. Goethals, who is now highway engineer of the State of New Jersey. In a recent report to the State Highway Commission, he said:

"Modern highways are a military as well as a transportation asset, and, whatever the cost, such improvements were never so greatly needed."







PLATE 15.

WOODEN GARAGE FOR SUBURBAN CAR OWNER

Permanence and Stability Obtained by the Use of Good Materials in a Structure Sufficiently Spacious for Freedom of Movement

UNDER present conditions with both labor and materials at almost prohibitive levels, the motor car owner desiring to erect a garage will favor one that calls for a cheap structural material, but which answers all the requirements of a suitable place for housing the car the year around. Whether he be a man of means or not the question of labor will be paramount to other costs and for this reason the type of garage shown here is one of simple form and which could be erected completely by the average man who is handy with the saw and hammer.

It does not follow that a wooden building of this type should have a cheap or shabby appearance and be a detriment to the property, but can be made to harmonize with most any type of dwelling with proper construction and finish, while the total outlay should not exceed \$250 complete if the owner does most of his own carpentry work, and the result is as satisfactory from a utility point of view as if a building costing several times as much had been erected.

It is well for the car owner to build a structure which, when completed, permits him more freedom of movement in the interior than to just squeeze in between the running board of the car and the side of the building. It is not well to be so intensely economical that the cost of making the garage at least two feet wider be allowed to deter the builder from obtaining a garage with sufficient room to work around the machine in comfort. Another disadvantage of too small a building is that when an overhaul of the machine is attempted it means that some of the bulkier components cannot be handled in the building.

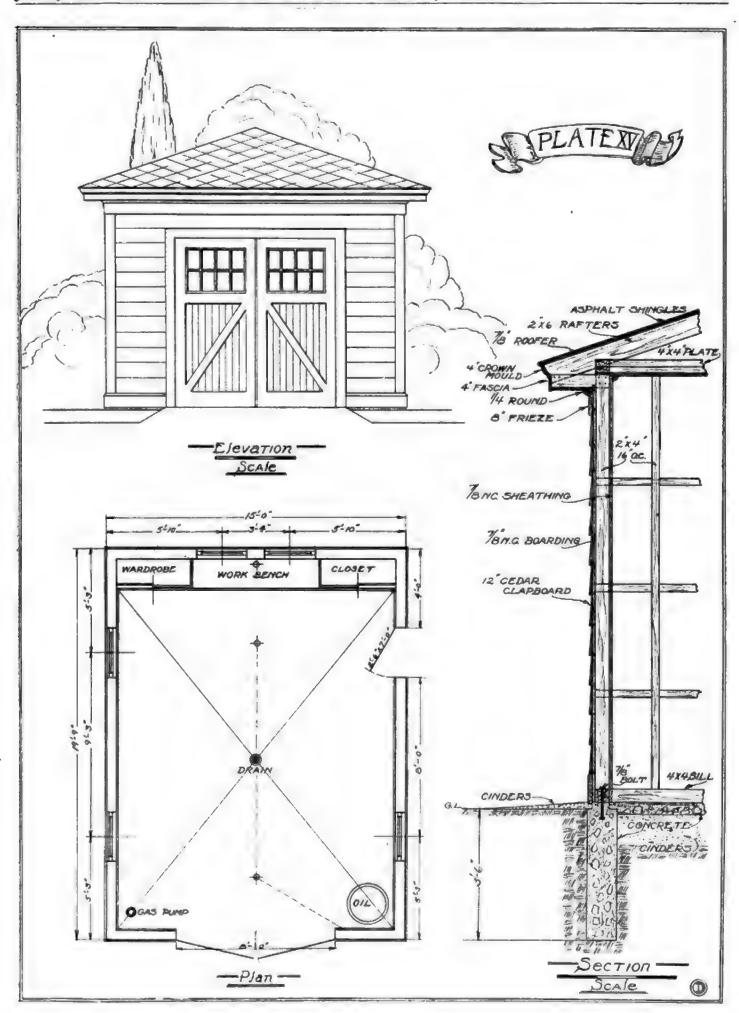
Permanence and stability are obtained by the use of good materials, hardware and paint and a solid, well constructed foundation and floor are valuable toward the same end. The foundation walls are 19 feet nine inches in length, 15 feet wide and nine inches thick, extending three feet six inches below grade and four inches above grade. For the walls a mixture of one part cement, two parts sand and five parts gravel or crushed stone is strong enough. After the excavations for the drain and piping have been made the ground within the walls should be tamped down hard and covered with a thin layer of cinders preparatory to laying the cement floor, which should consist of another layer of concrete three inches thick, composed of the same mixture as in the walls, and a surface layer one inch thick of one part cement and two parts sand.

When the walls are cast eight-inch bolts seven-eighths of an inch in diameter should be placed in the mixture so that the threaded end will extend 4½ inches above the surface. These are used to secure the sills to the foundation.

The frame of the building is erected on sills four inches square and is built of 2x4 inch studs, 11 feet long, 2x6 inch spruce rafters on 4x4 inch plates made by nailing two 2x4 inch joists together as shown in detail. The walls are of seven-eighths inch boarding and 12 inch redwood clapboards laid 10 inches to the weather. The roof is of the hip type and is made of 2x5 inch jack rafters and 2x6 inch spruce rafters, with seven-eighths inch North Carolina roofer and covered with green asbestos shingles. All exterior work is of seven-eighths white pine stock, including cornice, corner boards, base boards and other exterior finishing material.

The appointments of the garage are complete, as shown in the plan, including wardrobe, work bench, closet, separate entrance, ample doors and five windows for light and ventilation. The windows may be hung or hinged as owner desires, but will be more attractive if made of sashes with small panes like those shown in the door. The main entrance, which is eight feet in width, gives ample clearance in driving in and backing out without danger of hitting the sides. The door way is closed with two swinging doors, 234 inches thick, with panel windows in the upper halves.

The interior walls and ceiling should be plastered or finished off with wall board as desired by owner. If it is to be located in a cold climate plaster is the preferable material, as it seals up the interior against the weather and makes it more economical to heat and eliminates the danger of freezing inside. It is the best plan to heat a garage of the wooden type from the house system if either steam or hot water are used and the radiating pipes should be hung along the walls or a series placed under the work bench, where the heat would have a tendency to concentrate, and directly in front and upon the radiator of the car on cold nights. This plan would call for less heat and give better assurance against freezing at all times, besides heating the end of the building, where a person woung spend most of his time in working.





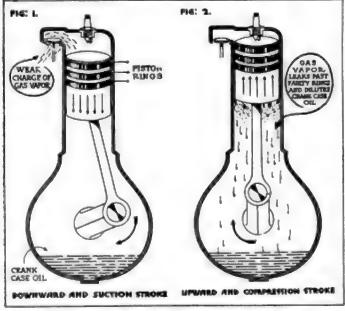


Tracing Troubles Caused by Leaky Piston Rings

Escape of Gas by Faulty Piston Packing Leads To Loss of Power and Damage to the Engine

By PAUL R. BEARDSLEY, Secretary and Treasurer the Piston Ring Co., Muskegon, Mich.

The average motorist does not pay very much attention to his car, except to know how to operate it. When his car is not running smoothly, which is very often the case, he is apt to run it into a garage and tell them to clean the spark plugs, readjust the carburetor, or to leave the instructions, "Fix it



Showing Weak Charge, Leakage and Oli Dilution.

up." Perhaps the spark plugs are dirty and when cleaned the car will run along smoothly, but only for a short time, when the same thing happens again. Most men have a very vague idea what the inside of an engine is like, but if they just gave it a little careful thought and study, a whole lot of engine troubles would be overcome, and this article is being written in an endeavor to explain the important part piston rings play in the efficiency of this unit.

For example—let us take the four-cycle, four-cylinder internal combustion engine, which is the machine almost universally used in automobile construction. We will take one cylinder and show the work that to be done by each one in turn.

The piston has a reciprocating motion, that is, it moves back and forth within the cylinder. Its first action is downward. This stroke is called the suction stroke, because it draws or sucks the gasoline vapor into the combustion chamber, supplying the fuel from which the engine derives its power.

Next comes the upward or compression stroke. The gas vapor is compressed. This pressure amounts to about 70 pounds per square inch. During this compression there is a hot spark in the spark plug, which instantaneously ignites the compressed gas. The explosion and expansion of gas forces the piston downward, and this power is transmitted to the rear wheels, causing the automobile to be propelled

The last upward or exhaust stroke forces the burnt gases from the cylinder and it is all ready to repeat the same operations

There is necessarily a small clearance between the piston and the cylinder walls to provide for free reciprocating motion, which must be taken care of, so as to create a uniform contact and pressure, which will make the piston bearing practically compression tight. This is accomplished by the use of piston rings, which fit into grooves in the piston and prevent the escaping of gases.

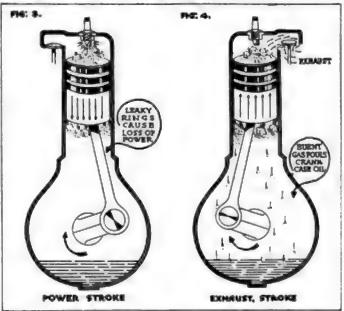
Figure 1 shows the downward or suction stroke of the piston. If the rings are not proof against leakage it is impossible to create a vacuum and consequently a weak charge of gas vapor is drawn into the cylinder head or combustion chamber. This mixture is further weakened by the air which escapes from the crank case past the rings into the combustion chamber, resulting in decreased power. This is a very ordinary trouble and the average motorist instead of equipping his motor with the proper piston rings will readjust his carburetor to get a richer mixture of gas, hoping to overcome this trouble. You can see at a glance that this is mere extravagance.

Figure 2 shows the compression stroke and the importance of the proper piston rings. If the rings leak some of the gas vapor instead of being compressed slips by the rings and condenses and dilutes the crank case oil. Many a car owner has ruined the bearings of his motor because of this trouble, but instead of equipping his car with new rings, he condemns the oil he has been using and seeks another grade. Perhaps the best way to explain the importance of compression is to mention the fact that if the compression is high enough (600 pounds or more per square inch) the gas ignites spontaneously.

Figure 3—The power stroke shows you how easy it is for gas to escape past the piston ring instead of utilizing all its expansive forces on the piston head where it belongs. In this case leaky rings cause a considerable loss of power.

Figure 4—The exhaust stroke shows how, with leaky rings the burnt gas, smoke and soot is not all forced through the exhaust manifold as it should be. This leaks past the rings and fouls the oil in the crank case, or remaining in the combustion chamber results in the accumulation of carbon deposits.

One of the most common and annoying troubles from leaky piston rings is with the spark plugs. Oil leaks into the combustion chamber and being burnt leaves carbon deposits on the spark plug points and also valve seats. To be efficient a spark plug must give an extremely hot spark and this cannot be done unless the points are kept clean. Of course carbon deposits on the valve seats prevent the valves from entirely closing, which cause a great loss of power and make necessary frequent regrinding of valves.



Showing Loss of Power and Fouling of Oil.



















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NOTE.—We do not doubt but that any extra heavy cup grease, well filled with graphite, would answer the purpose for lubricating the springs.—Editor.

LUBRICATING THE SPRINGS.

(R. L. Prindle, No. Abington, Mass.)

Second Best Letter.

The lubrication of springs is often neglected by the average driver, who pays no attention to them until they squeak and cause hard riding, a condition brought about by the collecting of rust between the leaves. In order to prevent this the leaves should be greased every month and thoroughly cleaned once every season.

Carefully remove all dirt or grit from the springs, shackles and clips with a stiff brush dipped in kerosene, then wipe them dry. Jack up the frame and remove the weight from the springs. After the clips have been loosened spread the leaves apart with a cold chisel and hammer or special tool, made for this purpose and obtainable at any repair shop or supply house.

If the leaves are rusted and the rust cannot be scraped off with the springs on the car they must be removed and cleaned with fine emery cloth or sand paper.

Prepare a thick paste of powdered graphite and oil or graphite grease and spread it between the leaves with a thin knife or hack saw blade. The excess grease forced from between the leaves as the weight is applied to the springs should be wiped off.

Frequent applications of graphite, using the above method, will keep the springs in the best condition, will pay dividends in easy riding and save money by preventing spring replacements.

SLIPPING CLUTCH.

(M. R., Washington, D. C.)

I have been having considerable trouble recently with the clutch on my car. This clutch is of the cone type and covered with leather. Under ordinary conditions, when under a load, the engine seems to run ahead of the car, caused by the slipping of the clutch. Will you kindly give directions for remedying this trouble?

The trouble may be traced to weak clutch spring tension or faulty clutch facing. The latter is the probable reason if the trouble is recent.

As a general rule wear of leather facing in a cone clutch is negligible if the clutch is given proper care and usage. Slippage is nearly always due to the smoothing over of the leather surface, because of the penetration of oil and dirt.

If the clutch fabric can be reached with a brush it should be given a thorough cleaning with kerosene oil and scrubbed with the brush until all of the surface oil and dirt has been removed. The clutch leather should then present a smooth even surface for contact, though, if left in this condition yould soon dry up and again become inoperative.

While the leather is still soft from the kerosene treatment, soak it well with neatsfoot oil, giving it as much as it will absorb.

If the leather has worn trouble frequently arises from the wearing of a shoulder on the rear edge of the leather. When this occurs the clutch cone does not engage with the flywheel the full surface of its face and it is necessary to file or cut away the shoulder before engagement will take place.

If after cleaning the leather it still fails to engage properly, the clutch spring or springs should be examined and adjusted more tightly. Some disc clutches have a number of springs, each of which should be tightened an equal amount to secure smooth engagement. Other clutches are fitted with a single spring, usually at the centre. The latter type may have provision for adjustment or not as the case may be. Where no provision is made for adjustment the placing of shims or washers between the spring and casting accomplishes the result.



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Sole Manufacturers Flint, Michigan

DELCO IGNITION COIL.

(S. E., Detroit, Mich.)

I have a Hudson car, equipped with a Delco starting, lighting and ignition system. I find that the platinum breaker points burn out rather rapidly and I have an idea the trouble is either in the coil or condenser. How can I test the coil and the condenser? Where is the condenser located on this machine?

The condenser on this system is located on the timerdistributor unit, just below the resistance coil, and is probably at fault if the breaker points burn out rapidly.

To test the condenser remove it from the unit and connect it in series with the storage battery and a six-volt lamp. If the condenser is punctured or short circuited the lamp will light, indicating a passage of current. A condenser is composed of a number of sheets of tinfoil, the alternate sheets being connected much the same as the plates of a storage battery. When new the condenser allows no passage of current through it.

If the condenser is found to be in good condition examine the breaker box mechanism and setting. The contact points should be dressed with a fine file or piece of sand paper until the contacting surfaces are perfectly parallel and flat. The engine should then be turned until the breaker arm rides upon the top of the cam. In this position the distance between the breaker points should not be more than .018 or less than .01 of an inch.

The coil is of the non-vibrating type and should deliver a spark from the secondary terminal at least half an inch long. Connect one terminal of the storage battery with one of the end binding posts on the coil. Place a hammer or other heavy metal object near to the secondary coil terminal on the side of the coil and snap the second battery wire rapidly across the other primary binding post on the coil. A spark should leap from the coil terminal to the metal object: To prevent any danger of shock to the operator, the metal object

should be connected with a short length of wire to either of the primary coil binding posts.

Too excessive a spark gap in the spark plugs often results in the burning out of the breaker points. The correct spark plug setting should be between .025 and .028 of an inch.

SPRING LUBRICATION.

(R. S. T., Marcy, N. Y.)

Do you think that full lubrication of automobile spring leaves is to be advised? Does it tend to lengthen the life of the spring, and if so, why is it that springs frequently break even when they are lubricated?

Engineers agree that the efficiency and life of a spring is increased by lubrication and practically all of the cars now being put on the market have their springs fitted with lubricating devices. Great care is used in manufacturing spring leaves to machine and polish the surfaces smooth and so reduce the friction to a minimum.

One prominent manufacturer makes a claim that a spring will not break if properly lubricated. This manufacturer puts on the market a spring lubricating device and guarantees to replace any spring that breaks within two or three days, or longer, after the installation of the device.

What is applicable to one leaf of a spring, is, in a measure, applicable to all, for each leaf is designed for its particular

position in the assembly.

Under a light load the tension at the centre of the leaf is at a minimum; this tension increasing toward the ends because of the slight curve of the spring. As the load is applied the tension at the ends increases and the tendency of the leaf to straighten causes the ends to slip along the leaf below, distributing the strain throughout its own length and along the next leaf, which in turn has a similar action against the next leaf.

Should the ends of the first leaf be held by friction so that they do not slide readily along the next leaf, the strain will be concentrated at the middle and not properly distrib-



may be essential to replace the gears, but this is very seldom necessary. Jack up both rear wheels and try the three speeds. By listening to the transmission, as well as the rear axle the amount of noise will show whether repairs are Becessary.

With a few special tools you should be able to make practically all of the necessary repairs yourself in your own garage, and unless it has had hard use, a full overhaul should not be required.

We would advise you to use the lubricating oil clear rather than diluting it with alcohol or kerosene. If the oil you are in the habit of buying is too heavy for your car, it would be better for you to get a lighter grade. Alcohol and kerosene are bad liquids to be mixed with lubricant. At present much of the wear and carbonization of gasoline engines is directly caused by kerosene in the fuel.

Lubricating oil is sold by makers who have spent much time and study perfecting their product. Many of the manufacturers maintain large experimental laboratories where the oil is subjected to all kinds of tests, and it is fairly safe to say that they spare no expense to produce what they think is a perfect lubricant. It is not, therefore, advisable to add any liquid, such as alcohol or kerosene, which are not lubricants, but quite the opposite.

STORAGE BATTERY ELECTROLYTE.

(L. A. J., Philadelphia, Pa.)

In all storage battery instructions the makers recommend that distilled water be used. Would it not be possible to use snow or ice water? None of the books say anything about the adding of electrolyte. I should think that if the battery was partially discharged I could add stronger electrolyte and bring the specific gravity back again, thus restoring the charge. Would this be so? Why is it that the books suggest the addition of water only? Where does the acid go to?

Snow or ice water will, in most cases, contain a certain amount of impurities, animal or vegetable matter, or mineral salts, which in time are certain to damage the battery plates. In falling through the air snow often collects impurities and, though it may be pure in the clouds, it quickly combines with foreign substances in the air. Distilled water is so easy to obtain and costs so little that to use impure water is not worth the risk.

A storage battery contains positive and negative plates, which are separated from each other and are acted upon by the electrolyte only when an outside connection is made. Should an infinitely small bit of metal such as platinum, iron, zinc, tin or copper be introduced into the cell, it will adhere to one of the plates and form a miniature battery in itself. Electrical action will commence in the cell and on the plate, and the plate will be cut through at the point where the metal happens to be.

Though the specific gravity of a storage battery is usually an indication of the amount of charge in the battery, it does not determine the current in the battery.

We will assume that an electrolyte test indicates a specific gravity of 1.200, and that the battery is being charged from an outside source. The electrolyte contains a certain percentage of sulphuric acid and water. As the battery is charged a substance termed the sulphate radicle is driven from the plates and combines with the water, increasing the specific gravity of the electrolyte. A certain amount of oxygen is liberated by the electrical action and escapes through the vents at the top of the cell. Every time the battery is charged a certain amount of the water vaporizes and must be replaced. The acid itself does not escape, hence no new acid need be added.

As the battery is discharged the sulphate radicle combines with the lead plates, and the specific gravity of the electrolyte falls. In this way the specific gravity acts to a certain extent as an index of the battery charge and discharge.

Suppose the electrolyte tested at a specific gravity of 1.200 in a partially discharged cell, and, following your surgestion, strong acid were added to bring the specific gravity up to say 1.300, which is practically an indication of a full charge. Since the plates have absorbed the sulphate radicle



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prenticeship as a tool maker with the Yale Lock Co., now the Yale & Towne Manufacturing Co. of Stamford, Conn. Later he worked at building, installing and testing marine engines. He also worked for the American Graphophone Co. at Bridge port, Conn., and as a mechanical expert in a New York patent office. He also did research work for the Union Typewriter Co.

In 1905 he went to the Pierce Arrow factory and was made superintendent two years later. He resigned late in the year and assumed charge of the production of Cadillac cars in Detroit on Jan. 1.

GENERAL CHASSIS OVERHAUL. (Continued from Page 16.)

remove the varnish at any point or the unprotected paint will be scraped off.

Successive coats of varnish should be added, each coat allowed to dry fully and then smoothed down with pumice. The number of coats will be determined by the condition of the body. The final coat should be applied with a soft brush, the varnish being rather thick and applied with long, quick strokes of the brush. Varnish dries quickly and unless the greatest speed in applying is used the final coat will show brush marks.

Repairing the Chassis.

In preparing the chassis for painting all of the grease should first be removed and the parts, such as springs, radiator, mudguards and fenders, as well as the body, taken from the chassis. A strong solution of potash lye will remove both grease and loose paint, though the lye should be fully washed from the metal parts before the paint is applied.

After the frame has been washed and fully cleaned a very careful examination should be made. All rivets fastening the cross members should be inspected and tightened if necessary. A loose rivet indicates weakness and should be removed and a new one put in its place. Broken frame members may be detected at this time and either welded or reinforced by new sections.

Where a break occurs in a frame member a reinforcing piece at least 18 inches long should be riveted to the member. Rivet holes should be bored just large enough to permit the entrance of the rivet and the rivets should be put into place and riveted while hot if possible. A word of caution here perhaps will not be amiss for the average autoist may not understand this process.

If a rivet is put into place and riveted over while heated a certain amount of contraction takes place in the rivet and binds the riveted members tightly together. The two members being riveted should not be heated and the rivet should be set as quickly as possible. An experienced riveter takes such a short time to "head over" that the rivet has time to lose but a few degrees of heat.

Before painting the frame all of the bolts which fasten the different units and control rod guides in place should be tightened so as to prevent rattles and squeaks. The springs should be disassembled and the contacting surfaces cleaned free from all rust and polished, then given a good coating of graphite and oil. Do not apply the paint too liberally to the springs or it will work between the leaves and cause friction. If possible, after the spring has been painted and finished it should again be disassembled and any paint that might have worked between the leaves removed.

Finishing the Frame.

Not so much care need be used in finishing the frame as was used on the body, three coats of flat paint and three of varnish should be sufficient.

Unsightly holes in the cast iron parts, blisters or cracks in the metal may be filled with an iron cement, obtainable from practically any hardware supply store.

The radiator presents the greatest difficulty in that a thick coat of paint should not be applied. This unit should be given a careful cleaning and scraped with a wire or stiff bristle brush. All grease should be removed with potash lye and a thin coating of flat color applied, any bubbles or paint or blisters should be smoothed off and a second coat applied when the first has dried. A spraying device, such as is used for applying cedar spray, may be used for this work. In-

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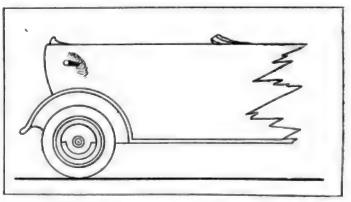
stead of using the mouth for air supply an air pump may be attached to the mouthpiece.

After the flat color has had plenty of time to fully set, one or two coats of enamel may be applied in the same manner. In painting the radiator only enough color and enamel should be added to secure a good finish, for thick coatings of paint have a tendency to reduce the radiating area quite appreciably.

Attending to Squeaks and Rattles.

If it were possible to construct an automobile of one piece much trouble and annoyance might be spared the owner. Such is not possible, however, and the one thing to do is to so fasten all parts as to make them practically one. With the body off the car much can be done to prevent the development of squeaks or rattles, for the repairer is able to inspect every part of the chassis and underneath part of the body. Wherever two pieces of wood are joined together by bolts and there is any danger of their working loose the contacting surfaces should be lubricated with wax prepared as follows:

Fill a large pan with boiling water and after being sure that there is no open blaze near, place a smaller can half filled with gasoline into the large pan. Into the gasoline shave up a quantity of parafine, or as much as the gasoline will dissolve, then remove the smaller can and add two teaspoonfuls of gasoline to prevent the mixture from solidifying when it cools. This may be applied with a brush and will soak into the wood, forming a permanently lubricated surface. Wherever wood contacts with metal this mixture may be used, but is not efficient where metal contacts against metal.



Where a Bend Occurs in an Inaccessible Place a Bar May Be Soldered to the Metal and the Dent Reduced by Twisting or Pulling on the Bar.

Where the body is attached to the chassis leather pads should be inserted, if possible, to prevent squeaks from developing. Many body builders run a long strip of heavy felt along the frame, thus preventing direct contact between frame and body. A paste composed of powdered graphite and oil is recommended for contacting metal surfaces and where leather washers or strips cannot be inserted.

A common cause for a noisy chassis is poorly fitted mudguards and fenders. The continued action of pull and twist throughout the whole machine quickly loosens bolts and nuts and rattles and squeaks soon develop. The repair man should take the greatest of care in fitting the guards and metal parts into place. Lock washers under the nuts should be inserted wherever possible.

NOTE-We have received a great number of letters from our subscribers telling of their appreciation for our overhauling stories. We would like to hear from many more. Are the stories helpful to you? Are the majority of our readers interested in seeing this series continued? Every reader who cares for the continuance of these stories should write us, giving the name of the car he most desires to see described. Cooperation on the part of our readers is essential for the success of these stories. Write your letter now .-EDITOR.









